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REPORT
OF
SENATORS PAUL O. HUSTING
AND
HENRY KRUMREY

Members of Special Legislative Committee appointed to
investigate and to recommend legislation relating to

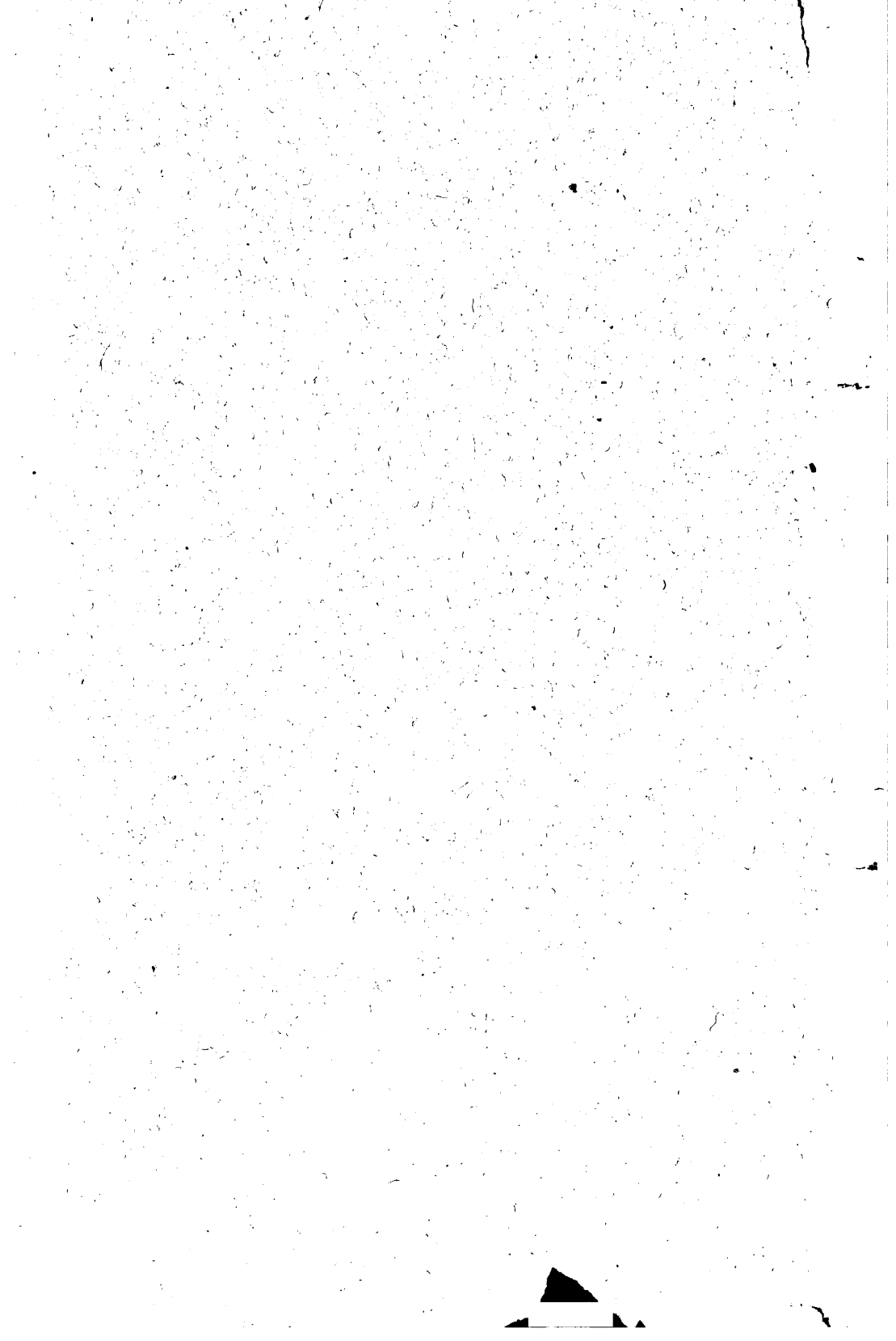
Water Powers, Forestry and
Drainage

Made to the Governor January 24, 1910.

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Water Powers, Forestry and Drainage

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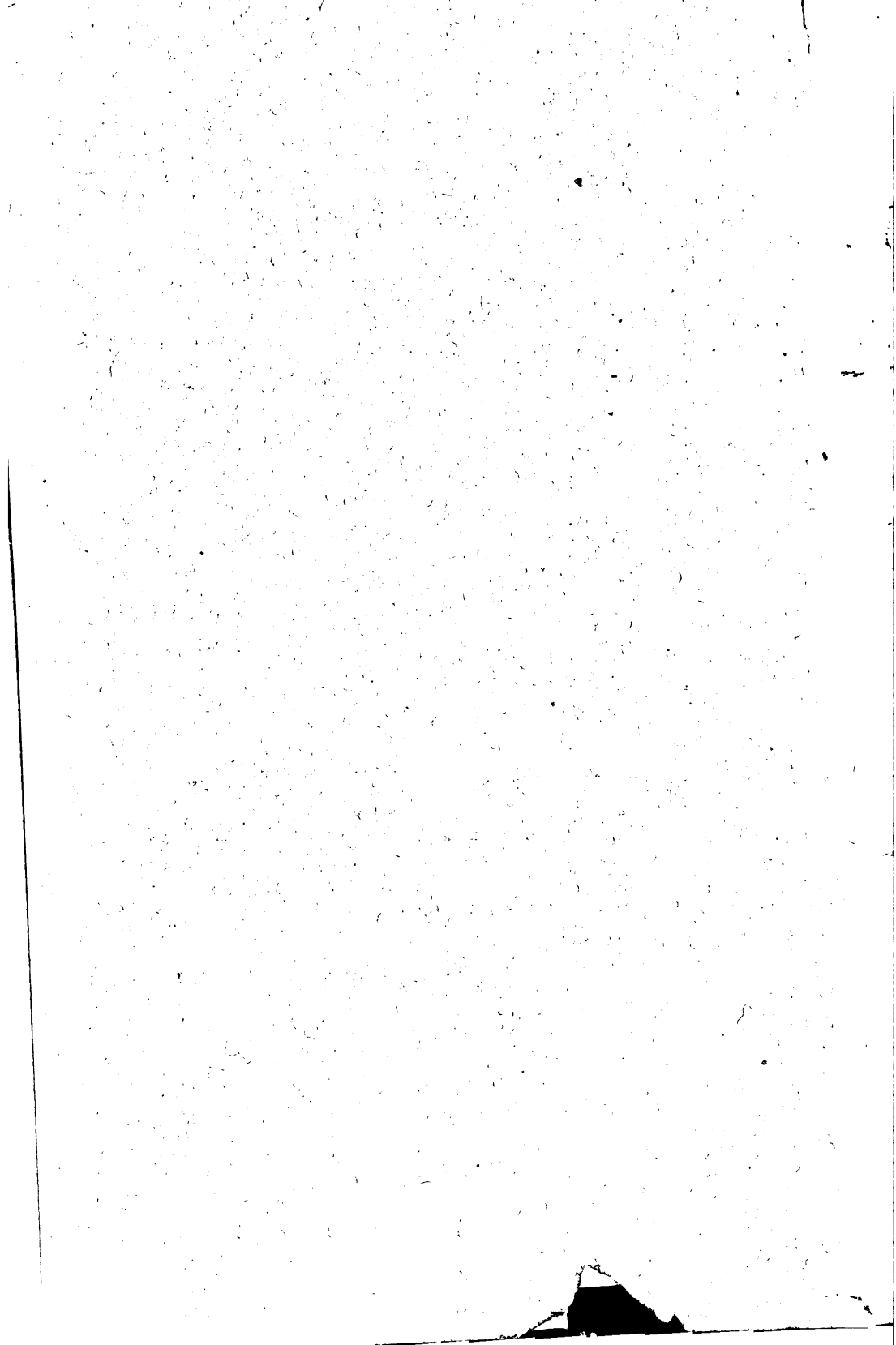
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REPORT.

*To his Excellency, the Governor, and the Honorable Legislature
of the State of Wisconsin:*

In compliance with the requirements of joint resolution No. 8, adopted at the regular 1909 session of the legislature, appointing a joint committee consisting of four members of the assembly and three members of the senate to thoroughly investigate the subject of the control of the water power by the state and the conditions upon which franchises for the same should be granted and the expediency of imposing a charge therefor; and to investigate such other matters pertaining to this subject as the said committee shall determine; and to draft a bill or bills covering such subject; and the further joint resolution No. 21, referring to this committee all bills now pending before the legislature granting, creating or extending any authority or franchise for the construction of any dam, reservoir, or reservoir system by any person, association or corporation; and joint resolution No. 38, A., to amend section 10, of Article 8 of the constitution relating to internal improvements and development of water power, we the undersigned, members of said committee have the honor to submit herewith the following report.

We are,

Respectfully,

PAUL O. HUSTING,
HENRY KRUMREY.

ACTIVITIES OF THE COMMITTEE.

The committee on water power, forestry and drainage was created by joint resolution No. 8 and supplemented by joint resolution No. 21, which provides for the appointment by the respective branches of the legislature of a committee consisting of three members from the senate and four members from the assembly.

The following were appointed members of said committee: Senators H. P. Bird, Paul O. Husting and Henry Krumrey, and Assemblymen W. M. Bray, George P. Hambrecht, James E. Thomas, and F. W. Kubasta. The committee met for the first time July 14, 1909, and organized by choosing Senator H. P. Bird, chairman and Assemblyman George P. Hambrecht, secretary. The chairman, secretary and James E. Thomas were chosen as a sub-committee to audit the expense accounts of the members.

For the purpose of familiarizing themselves with pertinent conditions, the committee made extensive trips throughout Northern Wisconsin, visiting the valleys of the Fox, Wisconsin and Chippewa rivers, and Northwestern Minnesota. Hearings were had at various cities located along and in those valleys and oral and written information was gathered, all of which is filed with this report and made a part thereof. No subpoenas were issued, but a general invitation was extended to the public to appear and give the committee such information as was desired. Generally speaking only those interested in the ownership or operation of water powers responded to the invitation. The only persons appearing by special invitation were State Forester E. M. Griffith, President C. R. Van Hise, Dr. E. A. Birge, Professor E. A. Gilmore, Professor D. W. Mead, and Professor L. S. Smith, who appeared before the committee in Milwaukee and all of whom gave information and were interrogated in regard to such matters as were before the committee.

Other reports will be filed going into the details of these trips and to avoid needless repetition, such detail is omitted herefrom.

THE DEVELOPED AND UNDEVELOPED WATER POWER RESOURCE OF WISCONSIN.

Wisconsin is rich in its potential water powers. While there has been some development of these natural powers it may be

said that such development is still in its infancy. As was natural the rivers in lower Wisconsin were first available for water power and for that reason show a larger percentage of development, but the rivers of northern Wisconsin, affording the greatest water power possibilities may be said to be scarcely touched.

A glance at Table I, following, shows that while the Fox and Rock rivers have been developed nearly to their full

TABLE I.

The following table gives the most important facts regarding the principal water power rivers of Wisconsin.

| River system. | Drainage area. | Total fall. | Already developed. | Easily developed. | Now developed. | Now undeveloped. |
|------------------------------|----------------|-------------|--------------------|-------------------|----------------|------------------|
| | Sq. mi. | Feet. | Feet. | Feet. | H. P. | H. P. |
| Wisconsin..... | 12,280 | 1,044 | 308 | 430 | 67,200 | 386,500 |
| Fox..... | 6,400 | 170 | 150 | 13 | 38,250 | 11,500 |
| Wolf..... | 3,650 | 800 | ..... | 400 | 2,580 | 34,000 |
| Menominee..... | 4,000 | 550 | 130 | 307 | 12,600 | 72,500 |
| Peshtigo..... | 1,123 | 1,040 | 30 | 880 | 2,190 | 33,800 |
| Oconto..... | 94 | 245 | 60 | 725 | 2,885 | 21,000 |
| Black..... | 2,270 | 570 | 95 | 400 | 2,200 | 16,500 |
| Chippewa..... | 9,573 | 730 | 300 | 700 | 20,000 | 156,000 |
| St. Croix..... | 7,576 | 322 | 50 | 200 | 18,600 | 45,800 |
| Rock..... | 3,500 | 132 | 67 | 14 | 7,700 | 1,000 |
| Milwaukee..... | 840 | 437 | 122 | 100 | 3,300 | 4,300 |
| Flambeau..... | 11,983 | 575 | 60 | 370 | 5,200 | 45,000 |
| Omitting Flambeau river..... | | | | | 183,105 | ..... |
| Including Dore Flambeau..... | | | | | | 827,900 |

L. S. Smith, University of Wisconsin.
Wisconsin Engineer, June, 1909, page 285.

capacity, such rivers as the Wisconsin, Chippewa and Flambeau show but a very small percentage of development. Figure 1 graphically shows this condition, the darkened part showing the percentage undeveloped. Again glancing at Table I, it will be noticed that there are 183,105 horse power developed and 827,900 horse power undeveloped in Wisconsin. On the Wisconsin river 67,200 horse power only, has been developed and 386,500 horse power remain undeveloped or nearly double the entire developed horse power in the state. On the Chippewa and Flambeau

rivers there are 25,200 horse power developed, and 201,000 horse power undeveloped or more than 17,000 horse power in excess of the entire developed horse power in Wisconsin. In fact it will be noticed that so far as the northern rivers are concerned there remains a great wealth of potential horse power yet to be put to beneficial use. These facts are cited to show the magnitude of the rivers and their potential powers and their importance to

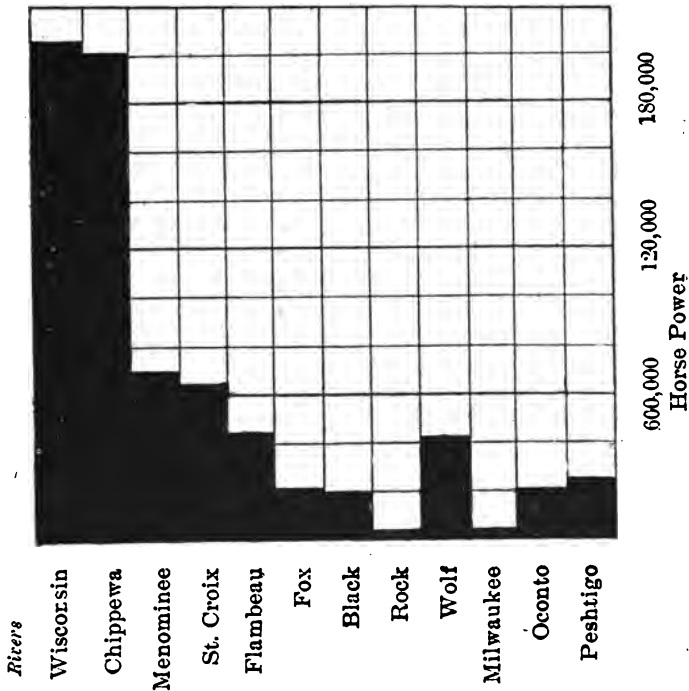


Fig. 1—Wisconsin Water Power, Undeveloped.

the state of Wisconsin. To quote Professor L. S. Smith, Associate Professor of Topographical Engineering of the University of Wisconsin, who has made a special study of Wisconsin rivers and their hydraulic potentialities: "The water power resources of Wisconsin excel those of any other state in the Middle West, indeed, they are probably excelled by only six or seven states in the entire union." * * *

"The importance of water power resources to a state so remote from coal mines as is Wisconsin is not likely to be overestimated. Unquestionably these Wisconsin rivers, if properly husbanded

and developed, are destined to exercise a profound influence upon the development of the state. Indeed, this result can even now be observed in localities like the lower Fox river, where the important water power developments have created a great industrial center." *Wisconsin Engineer*, June 1909, p. 273.

THE INCREASE OF THE DEVELOPMENT.

That it is essential for the best interest of Wisconsin and its people that these water powers should be developed, cannot be questioned, and there is every reason to believe that such development is at hand. The events of the past few years have demonstrated that water power is coming more and more into use and supplanting steam in all lines of industrial activity and especially along the lines of transportation, lighting, heating and other public utility purposes.

During the past few years the development of immense water powers on the Wisconsin and Chippewa rivers is most marked. Great industries and great power transmission plants have been established at various points. The water powers of the Wisconsin river at points of development are manufacturing the paper for the metropolitan dailies as well as transmitting the power for driving the street cars both in the valley and in distant cities.

There is no question but that Wisconsin by reason of its great natural water power resources is destined to become at no distant day, the workshop of the Mississippi Valley.

Figure 2, page 8, shows an interesting curve indicating the rate of increase in development along the lines just stated. It appears therefrom that between 1860 and 1890, the rate of increase was quite slow, being only about 1000 horse power per year. Beginning, however, with 1890, there is a great change, showing a much larger increase in power development. From 1890 to 1900 the increase was 40,000 horse power or at the rate of 4,000 horse power per annum, and from 1900 until 1909, the increase was 83,105 horse power or at the rate of over 9,200 horse power per annum. During the last nineteen years approximately 120,000 horse power have been developed, nearly twice as much as had been developed theretofore in the history of the state and territory. Commenting on this sudden in-

crease, Professor Smith says: "Unquestionably no single factor has contributed so much to bring about this wholesale use of water power as the recent development of the electrical transmission and generation of power, permitting, as it does, the generation of power at a distant point, where it may be found in great quantities and transmitting it to other localities where transportation or other facilities render it more valuable." L. S. Smith, University of Wisconsin, *Wisconsin Engineer*, p. 279, 1909.

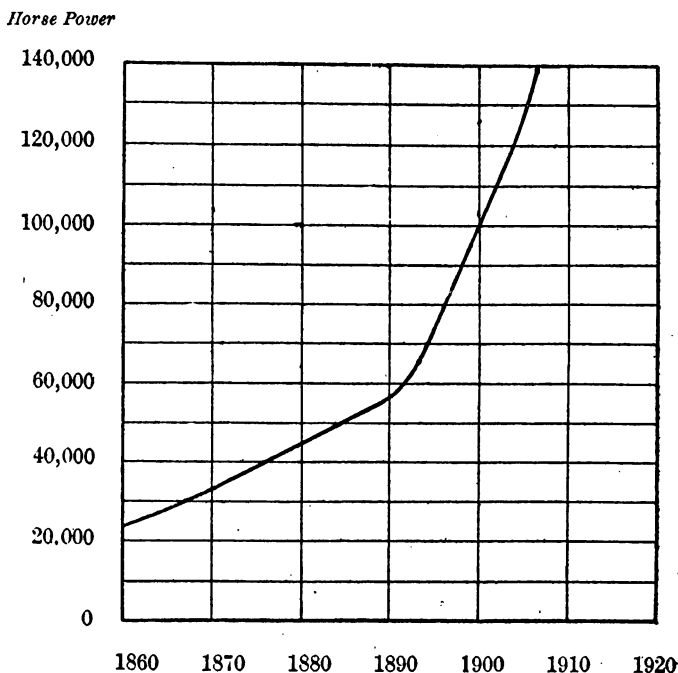


Fig. 2—Wisconsin Water Power Developed .

The increase in the use and development of water power is not characteristic of Wisconsin alone, but a like increase has manifested itself throughout the United States and has attracted the attention of engineers as well as public men. The reason for this is not difficult of apprehension.

H. St. Clair Putnam, a noted engineer, in explanation of this increasing development, goes into the history of power development and divides the same into three periods.

In the first period he classes the power produced by natural forces, such as falling water and wind, showing that its utilization was necessarily confined to the place of development.

In the second period he classes the steam power, which during the development of coal mines and rapid growth of our railway systems, imparted a tremendous stimulus to commercial enterprise. In both the first and second classes the size of the plant is necessarily limited to the production of power to meet the requirements of the individual user at the place of development.

He describes the third period as follows: "Electrical transmission of power is the new art which now is resulting in another and radical change in methods of utilizing our power resources, permitting, as it does, development whether by water power or by steam at points most convenient and economical, and transmission to the consumer in form adapted to great variety and convenience of use. This new development in applied science calls for reappraisal of the sources from which our power is derived. The size of the power plant is no longer limited to the requirements of the individual user, but the power for the entire communities can be supplied from a single station."

"The enlargement of this field newly opened by the electric transmission of power from great distances is now in active and practical development. As a result rapid changes are taking place in the methods of using power. New economies are possible of accomplishment and the resulting effect upon the conservation and utilization of our power resources is of the greatest importance." H. St. Clair Putnam, L. L. B. E. E. Con. Eng. New York, p. 292, Conference of Governors.

Thus great emphasis is put by Mr. Putnam upon the new art of transmitting power. By such discovery the power of a river however remote from centers of industry and civilization may be transmitted, without any or little depreciation, right to the centers of population. Powers therefor on remote streams have become immediately available, and therefore valuable, and the increase in development of these powers is not to be wondered at.

On page 297, Conference of Governors, Mr. Putnam, after estimating the number of horse power developed in the United States continues as follows: "Of the total 30,000,000 horse

power, including the railroads, used in the country, it is estimated that 9,000,000 horse power, or 30%, is not utilized electrically (electric power generated in isolated plants not included in the census reports). This highly remarkable growth has been accomplished in 25 years. The use of electric power at the present time is being doubled, approximately every *five years*, as contrasted with the phenomenal doubling of the total power every *ten years*. If the present rate of increase is maintained, electrically applied power will equal or exceed the power mechanically applied in 1920. This great growth is due to the convenience, earning capacity, and economy resulting from the use of electrically applied power. The significance of this remarkable increase in the use of electric power in manufactures and other industries lies in the market thus provided for the utilization of our water powers wherever located and whatever their magnitude."

The *Electric World*, January 6, 1910, says editorially: "The steady increase in the demand of power owing to the growth of manufacturing interests, and the certainty that the price of fuel is on the upgrade, have operated to bring hydraulic power into prominence in the financial sense. If anything more were needed to accomplish this result, it may be found in the vigorous agitation on the part of some of the Government officials regarding the policy to be pursued with the water-powers on the public domain."

It will be seen that the ability to transmit power has become a great factor in making water power available and therefore more valuable. It has brought the market for power and the source of power, though remotely separated, together. Another even greater factor, however, in making water power valuable is the saving represented by this power over the cost of an equivalent amount of steam power. It is conceded by all authorities that water power is the cheapest power obtainable and that with a reasonable steady stream flow and fair load factor steam power cannot compete with it. As the demand for power electrically transmitted and the use of electricity increases, the more and more valuable and the greater the saving in the use of the water power. As coal becomes scarcer and scarcer and therefore higher in price as it is bound to become, the greater the economy in the use of water power and the greater the value. The value

and importance of water powers of the Nation was well stated by Governor Hughes at the Conference of Governors:

“Controllable power is the vital force in our industrial development and one of the chief elements upon which civilization is based. Manufacturies, transportation, and artificial light are largely dependent upon it. The more complex our civilization the more intricate our manufacturing enterprises, and the more important rapid transit becomes, the greater our dependence upon this force. There are two sources of power, available—coal and falling water. Both require skill and money to turn their latent force into active energy. Coal once used is gone, but water, however often utilized, returns again. Coal is growing less plentiful and more expensive, while water by the processes of nature keeps up its original force without additional cost.”

“It is universally conceded that the use of falling water for power purposes is much more economical than coal. As competition becomes more acute the value of water power over steam becomes greater. Cheap power must continue to be a vitally interesting subject to those who manufacture goods, provide transportation, and furnish light. The discoveries which permit the carrying of electrical currents a long distance have already increased the value of falling water for power purposes. Such power must of necessity continue to grow in value as new opportunities for its use appear, and as the price of fuel advances.” Governor Hughes, Conference of Governors, p. 325 citing report of State Water Supply Commission.

While important to the country at large, the use of falling water for power is more vitally important to the industrial developments in a state like Wisconsin, which has no coal mines and which is situated remote from the coal fields. With water powers fully developed to their highest efficiency, Wisconsin will be in a position to outdistance all its coal power competitors. We quote Professor Smith as follows: “Probably not more than a half dozen other states in the Union are so favorably situated with reference to water powers as is Wisconsin. If properly husbanded and developed it seems certain that at an early date these water powers will be regarded as the most important natural resource of the state. While single developments of from 10,000 to 30,000 horse power are not wanting,

it is their general distribution over nearly the entire state, rather than the great size of a few plants, that is most characteristic. * * * Unlike other great natural resources of the state, such as the forest and mineral wealth, the utilization of which means the final destruction of the source of supply, the water power resources are as certain and eternal as the sunshine. The importance of water powers to a state so remote from coal mines as is Wisconsin is not likely to be overestimated." Wisconsin Survey Bulletin XX, pp. XVIII and I.

PECUNIARY ADVANTAGE OF WATER POWER OVER STEAM POWER.

While a great many men appeared before the committee at the various points visited and gave information along various lines, the committee was unable to get any information showing the pecuniary advantage of the use of water power over steam power at the points visited. While questions were asked by the committee along these lines they were informed that as a general rule steam power was used as an auxiliary to water power and the system of bookkeeping was such that it was impossible to give any definite information of the difference between the cost of producing power by falling water and producing the same by coal. Having been unable to secure such information in that manner, the committee prepared a list of questions for the purpose of securing that and other information which might be of use or interest in making a report, a copy of which questions is hereto annexed and made a part of this report. A copy of these questions was sent to each water power owner and user in Wisconsin to the number of 543, and such owner or user was requested to favor the committee with full and complete answers if possible.

Up to the time of making this report but seventy answers had been submitted to us, and of these but a very small percentage gave any of the information asked for. Only a very small number gave any information whatever as to the cost of producing power by water, as compared with the cost of producing the same by steam. For instance, but seven answered No. 11, eight answered question No. 23, two answered question No. 5, four answered question No. 26, eight answered question No. 27, ten answered question No. 32 and seven answered question No.

36. The answers received will be filed with the report of the committee, but are too meager and insufficient to be of any use or assistance in arriving at the facts sought, and gave very little if any light upon the questions. This is mentioned in passing for the purpose of showing the difficulty in presenting accurate estimates of the economy in the use of water over steam. As a matter of necessity, therefore, we have been compelled to seek other authorities for information upon the subject and so far as we may, apply such to existing conditions in Wisconsin, and thus arrive at approximate results.

Some authorities assert that the economy in the use of water over coal in the production of power is equal to the cost of coal in producing that power. This could be taken as correct, everything else being equal, that is easy to say, if the cost of the plant, the operating expenses, the fixed charges and all the other things entering into the equation were the same in both instances. There are, however, so many different factors entering into the equation that figures cannot be given that will apply to every situation alike. For that reason we are obliged to take the opinions from those that profess to know and who should know.

For instance, Professor Smith in the Wisconsin Survey, Bulletin XX, p. 2, computes the annual saving represented by water power over the equivalent amount of steam power at \$20 per horse power per annum. Governor Hughes of New York, Proceedings of Conference of Governors places it at \$12 per horse power per annum. We think it is conceded that as a general proposition, the savings represented by water over coal over the equivalent amount of steam power (in Wisconsin) is approximately \$15 per horse power. Assuming that to be approximately correct, this would mean a saving upon the developed horse power in Wisconsin, namely, 183,105 horse power, at \$15 per horse power, the sum of \$2,745,000 per annum, and a saving on the undeveloped power, namely 827,900, at \$15 per horse power, or the sum of \$12,418,000, or a grand total of \$15,163,600 per annum, upon the potential horse power of Wisconsin, when fully developed, figuring coal at its present price.

An investment which will produce at 7 per cent an income of \$15 per annum is approximately \$210. Computing the value of a horse power developed in Wisconsin at \$210 per horse power,

the developed horse power would represent a value of \$38,130,000, and the undeveloped horse power, \$173,859,000, or a total value of \$212,289,000, and this valuation would be based not upon the value of the plants, but upon the difference in the saving value alone between the use of water and coal in the production of power, that is to say the franchise value. This computation, of course, is made upon the assumption that the total horse power is developed and is continuously in use the year around. It is a fact, however, that but few water powers can be continuously operated at full potential energy. There is considerably fluctuation of water supply, dependent upon the season of the year.

Now even though these figures be discounted materially and all possible allowance made, we still see how immensely valuable and important these resources are to the state. It is inevitable that they increase in saving value by leaps and bounds as the demand for power and the cost of coal, increases.

Now we have thus far only spoken of the profits that the water powers yield to the operator or user and the value to him. There is another factor to be taken into consideration, however, and that is the conservation of coal supply by the substitution of water power. Engineer Putnam estimates that seven tons of coal are consumed on the average in the production of one steam horse power per annum in our most modern steam electric plants and greatly in excess of that in an ordinary steam plant, so that for every horse power produced by water at least seven tons of coal are saved.

Mr. Putnam, Conference of Governors on page 295, furnished some estimates. He says there are at least 30,000,000 potential water horse power in the United States. He goes on: "Using the smaller figure of 30,000,000 horse power as an illustration, to develop an equal amount of energy in our most modern steam-electric plants would require the burning of nearly 225,000,000 tons of coal per annum, and in the average steam-engine plant, as now existing, more than 650,000,000 tons of coal, or 50% in excess of the total coal production of the country in 1906. At an average price of \$3.00 per ton it would require the consumption of coal costing \$2,000,000,000, to produce an equivalent power in steam plants of the present type." H. St. Clair Putnam, L. L. B., E. E., Member of

American Inst. A. I. E., Consulting Electric Engineer, New York.

Applying the foregoing figures to Wisconsin we find that to produce 200,000 horse power it would require approximately 1,500,000 tons of coal per annum, which at \$3.50 per ton, represents a saving in coal of \$5,250,000 per annum; on the total development of 1,000,000 horse power the savings would be just five times as great or 7,500,000 tons of coal at a value of \$26,250,000 per annum.

The saving of coal thus shown is startling and yet the figures are given by one who should know and who is a recognized authority. But even if exaggerated, we cannot help but be impressed by the tremendous conservation of the coal supply which would thus result.

Thus we find a twofold advantage in the use and development of water power. First, a great saving in the cost of production of power and secondly, the conservation of the coal for use and generation of power in communities less favored by nature than Wisconsin. It is not then surprising that we awaken to the realization of what the utilization and conservation of our water powers mean to the state and nation. With the exhaustion in the coal supply already forecasted, we are appreciating that then but one source of power will remain, viz., the falling water.

MONOPOLIZATION OF WATER POWER.

Not only, however, have we begun to fear the exhaustion in the coal supply, but another fear confronts us, namely, the fear that the water power, like the coal fields will become the property of and for the benefit and profit of the few, instead of for the use and benefit of the many. That this fear is not entirely groundless, may well be conceded.

The committee found no evidence of any water power trust in Wisconsin, but while there is an absence of anything showing any such trust in the state, we are inclined to believe that what has occurred by way of monopolization of other great natural resources in the *past* is not impossible or improbable in Wisconsin in the *future*. History and experience has taught us that nearly everything of necessity and value in the way of

natural monopoly, has been monopolized. Therefore, it behooves the people to take steps necessary to prevent such monopolization of the water powers in this state.

We print below excerpts from the utterances of well known men and bodies of men, particularly calling the attention of the people to the danger of monopolization.

The first excerpt is from the report of an international conservation commission, pointing out the dangers not alone in the United States but in other countries as well.

“We regard the monopoly of waters, and especially the monopoly of water power, as peculiarly threatening. No rights to the use of water powers in streams should hereafter be granted in perpetuity. Each grant should be conditioned upon prompt development, continued beneficial use, and the payment of proper compensation to the public for the rights enjoyed, and should be for a definite period only. Such period should be no longer than is required for reasonable safety of investment. The public authority should retain the right to re-adjust at stated periods the compensation to the public and to regulate the rates charged, to the end that undue profit or extortion may be prevented.”

| | | |
|------------------------|---|--|
| Gifford Pinchot | } | Commissioners representing the U. S. |
| Robert Bacon | | |
| James Rudolph Garfield | | |
| Sydney Fisher | } | Commissioners representing the Dominion of Canada. |
| Clifford Sifton | | |
| Henri S. Beland | | |
| Romulo Escobar | } | Commissioners representing the Republic of Mexico. |
| Higuel A. de Quevedo | | |
| Carlos Sellerier | | |

Mr. Gifford Pinchot, Farmers Bulletin page 327, says: “If the public does not see fit to see to it, that the control of water power is kept in the hands of the people, we are certain in the near future to find the resources in the grip of those who will be able to control, with a monopoly absolutely without parallel in the past, the daily life of our people. In every activity of his life that man and his family and his neighborhood will have to pay toll to those who have been able to monopolize the great

motor power of electricity made from water power, if that monopolization is allowed to become established. Never before in the history of this or any other free country has there existed the possibility of such intimate daily friction between a monopoly and the life of the average citizen."

In its report the Inland Water Commission says: "Among these monopolies, as the report of the commission points out, there is no other thing which threatens, or has threatened such intolerable interferences with the daily life of the people as the consolidation of companies controlling water power."

"In the light of recent progress in electrical appliances it is clear that over wide areas the appropriation of water power offers an unequaled opportunity for monopolistic control of industries. Wherever water is now, or will hereafter become the chief source of power, the monopolization of electricity produced from running streams involves monopoly of power for transportation of freight and passengers, for manufacturing and for supplying light, heat and other domestic, agricultural, and municipal necessities, to such an extent that unless regulated it will entail monopolistic control of the daily life of our people in an unprecedented degree. There is here presented an urgent need for prompt and vigorous action by the state and federal government." Preliminary Report of Inland Water Commission, p. 22.

The Water Supply Commission of Pennsylvania in its 1907 report, pp. 86, 87 and 88, informs as follows: "Since 1895, when the General Corporation Act of 1874 was amended to admit of the formation of water power companies, there have been 73 such corporations organized. Their charters cover municipal districts in all parts of the state, but the majority are located in the Central and Eastern parts."

"These companies have purchased or merged with one another to a considerable extent, the records showing five mergers, involving sixteen charters; and two consolidations by purchase of rights and franchises, involving eight charters. Of the 73 charters issued, but 17 have been found, by the investigations of the commissions, to be generating and distributing power by virtue of the rights so granted."

The report of the National Conservation Commission, a portion of which follows, presents some astounding figures and facts:

"An estimate of the water power, developed and potential, now controlled by the General Electric interests, admitted or sufficiently proven, is about 252,000 horse power; by the Westinghouse interests, similarly known, about 180,000 horse power, and by other large power companies, 875,000 horse power. This makes a total of 1,307,000 horse power. Adding the horse powers of the third class (c), those whose connection with these two great interests is at least probable, to-wit, 520,000 horse power, we have a small group of 13 selected companies or interests controlling a total of 1,879,000 horse power developed and undeveloped.

"Assuming that the water power at present in use by water-power plants in the United States, is 5,356,000 horse power, as estimated by the United States census and Geological Survey from figures of installation, we see that approximately a quantity of horse power equal to more than 35 per cent of that amount is now probably controlled by this small group of interest. Furthermore, this percentage by no means tells the whole truth. The foregoing powers naturally represent a large proportion of the best power sites. These sites are strategic points for large power and market control. Poorer sites will not generally be developed until these strategic sites are developed to their full capacity. And should these strategic sites be "coupled up" they become still more strategic. There are powerful economic reasons for such coupling. The great problem of water-power companies is not only that of the 'uneven load', common to all power companies, but especially that of an uneven source of power, because of the fluctuating flow of the stream. A coupling up utilizes not only the different storages in the same drainage basin, but, of still greater import, the different drainage flows of different basins. Also, by coupling up powers which have largely "day loads" can at night help out other powers which have largely "night loads", and vice versa. Coupling up is rapidly in progress in the United States. The Niagara Falls Power Company and the Canadian Niagara Power Company are coupled. The Southern Power Company, in North Carolina and South Carolina; the Commonwealth Power Company, in Michigan; the Pacific Gas and Electric Company, the Pacific Light and Power Company, and the Edison Electric Company, in California—each concern has its various developments coupled upon into one unit.

"The economic reasons urging water-power concentration are thus obvious. The facts set forth above show the very rapid and very recent concentration that has already occurred, practically all in the last five years. These economic reasons and business facts indicate clearly the further progress toward concentration that is likely to occur in the near future. It is obvious that the effect on the public of such present and future conditions is a matter for serious public consideration." Report of National Conservation Commission, pp. 176 and 177.

Now to the end that the water powers of the state may be fully developed, and the location and creation thereof and the use and distribution of the powers generated thereby, may be regulated and controlled for the benefit of all the people, we make the following

RECOMMENDATIONS.

1. Section 1596 of the statutes which provides that "all rivers and streams which have been meandered and returned as navigable by the surveyors employed by the government of the United States are hereby declared navigable so far as the same have been meandered to the extent that no dam, bridge or other obstruction shall be made in or over the same without the permission of the legislature. * * *," be amended so as to include in terms all navigable streams whether meandered or not which are navigable in fact for any purpose including those navigable for logs and row boats.

The section just referred to was passed in 1853 and pursuant to the same about 600 acts of the legislature were passed granting franchises for the erection of dams upon the navigable rivers of the state. The supreme court has in effect interpreted this section as covering all streams which are navigable in fact and which are proposed to be covered by the amendment, but we deem it advisable for the state to declare in unmistakable terms the policy of the state in regard thereto. (Exhibits A, B and C, showing a summary of 665 acts of legislature granting dam franchises and the purpose for which granted and the restrictions and conditions imposed, is annexed to this report for general information.)

The state should declare in unmistakable terms that the use

of water in navigable streams and lakes for power developed under a franchise from the state is a public use; and all of the energy developed or undeveloped of the water in the navigable streams is subject to the control of the state for the greatest public good.

The state now regulates and controls under the public utility act, the distribution of power whether generated by water or coal. The state should go farther. When a franchise is given for the development of water power, the state should exercise the right to regulate the creation and use of that power; since it is a matter of public concern to regulate the *distribution* of power, it must be of the first importance to regulate the *creation* of that power. By declaring the creation of water power under a franchise, a public purpose coordinate with the improvement of navigation, and by giving the right of eminent domain to the grantee and permitting him to sell the same to the public and *compelling* him to sell the surplus power to the public, such franchise gives the grantee the status of a public utility and renders such grantee amenable to public control.

3. The state should declare that the beneficial use and natural energy of the water of the navigable streams and lakes of this state for all public uses belong to the state in trust for all of the people.

The legislature should assert that the state is trustee for the people of the beneficial use in and to the natural energy of the waters of the navigable streams and lakes for public purposes as against the individual, to the end that the state may use it as public necessity or convenience may require, or to the end that the state may delegate it by franchise to individuals to use the same, subject to such trusteeship, upon such terms and under such conditions and circumstances as the public good may require.

4. No franchise should hereafter be granted to any person, firm or corporation for the erection and maintenance of any dam upon any navigable stream except for the improvement of navigation and the development of hydraulic power or in addition thereto, for any public purpose. No such franchise should be granted without giving the right of eminent domain to the grantee thereof or without providing in terms that such franchise is given in consideration for the promise and agreement on the part of the grantee to comply with all the terms

imposed by law and by such franchise. And further that every such franchise is accepted, taken and held by said grantee subject to the conditions and terms thereby or thereafter imposed by the state and is so accepted, taken and held in consideration of the power, privilege and prerogatives conferred by such franchise.

The purpose of this provision is to make the franchise a contract between the state and the grantee whereby the state gives certain rights, privileges and prerogatives of sovereignty to the grantee and in consideration whereof the grantee obligates himself to do and perform all and every condition imposed upon him by such contract. This will enable the state as a matter of contract between it and the grantee to manage, control and regulate the erection of dams and the development of water powers upon such terms as it may require.

5. All dam franchises granted by the legislature in the past so far and to the extent as the same are subject to repeal, should be repealed and the holder thereof be required to file a written acceptance of a franchise subject to all the conditions herein recommended. Exhibit C shows that the legislature out of 665 acts granting franchises expressly reserved in 324 of those acts the right to alter, amend or repeal the same at any time. The state probably has, subject (to limitation), the power whether the right is expressly reserved or not, to alter, amend or repeal a franchise at any time. The purpose of this provision is to place past and future water power appropriators on a footing of equality in so far as the state may be able to do so and also to conserve as far as possible the rights of the people, to all the navigable streams of the state.

6. No franchise should ever be granted in perpetuity but should be for a definite period only. Such period should be no longer than is required for reasonable safety of investment.

We recommend that no franchise be granted for a longer term than 20 years with the privilege of continuance for two further and successive terms of ten years, each at the option of the grantee. The state should retain the right to readjust (at stated periods) the compensation to the public. The purpose of this provision is to give a sufficiently long period of enjoyment to the investor under unchanging terms and conditions, so that the same will attract and justify investment in the development of power and industrial enterprise connected there-

with. The period stated we believe will give every investor practically a life time in which to get returns on his investment and on the other hand will leave to future legislatures the right to legislate to meet the conditions then existing.

7. A reasonable franchise fee should be imposed.

A franchise to an individual gives to him a special privilege to enjoy the valuable rights conferred by a franchise. It is but just that in return for such special privilege the party so favored should reciprocate to the public; in consideration thereof such grantee should contribute toward defraying the expenses of government, something over and above that contributed by the individual not so favored. In other words, special compensation should be paid for a special privilege. The people should share in some manner in the benefits of a great natural resource which is the heritage of all.

It is recognized that the water powers of the state should be developed as fast as conditions warrant and that nothing should be done that will deter any reasonable man from embarking in such development. While it is conceded to be important that water powers be developed quickly, yet it is most important that the same be developed in a proper manner and along lines most beneficial to the greatest number. It is plain that at this time when this development is still in its infancy and like all new enterprises less remunerative than when permanently established, the fee imposed should be quite reasonable. It should not be expected that the income derived from such sources should from the beginning be a very large one. To lay the foundation for a considerable income for the future rather than to realize a large income for the present is the object of this recommendation.

The committee recommend the levying of 10% on the annual franchise value per horsepower. By annual franchise value is meant the difference in cost between the production of horsepower by water power and the production of horsepower by steam power at the same place in like quantities and under like circumstances. This franchise fee therefore is based upon the actual value of the privilege conferred by the franchise which basis is deemed equitable and just.

8. The state should fix the location, height, and general construction of the dam in order that the power may be developed

to its highest potential efficiency as well as to promote public safety.

9. The state should prohibit any monopolization of water power upon pain of forfeiture of franchise.

10. The state should reserve the right whenever the public necessity requires to take over and condemn any water power for a public purpose.

11. The state should reserve the right to compel substantial compliance with all the provisions of law under penalty of forfeiture of franchise.

12. At the expiration or forfeiture of franchise, all rights exclusive of physical property should revert to and become the property of the state in trust for all the people and that at the expiration or forfeiture of the franchise, the water power privilege may be reappropriated with right of condemnation and sale of all physical property not removed by the old appropriator.

14. The grantee of a franchise should be required to keep records and accounts open to inspection by the state similar to those kept by the public utilities, as required by law.

RESERVOIR SYSTEMS.

15. We recommend the adoption of joint resolution No. 33, referred to this committee amending section 10, Article 8, of the constitution by adding at the end of said section the following: "Provided that the state may appropriate moneys for the purpose of acquiring, preserving, and developing the water power and the forests of the state; but there shall not be appropriated under the authority of this section in any one year an amount to exceed two-tenths of one mill of the taxable property of the state as determined by the last preceding state assessment"; and we further recommend that if such amendment be ratified at the polls by the people upon its submission to them that the state itself create upon the head waters of all the important navigable streams of the state a system of reservoirs for the purpose of improving the navigation thereof, producing a uniform flow of the water, and keeping back the flood water in times of freshets, thereby increasing the potential efficiency of the water powers on such streams, decreasing damage by flood, improving sanitary conditions and (by charging tolls upon a reasonable basis for benefits enjoyed by reason thereof to parties directly so benefited) provide a satisfactory annual income to the state.

The Wisconsin Valley Improvement Company in the year 1907, was incorporated for the purpose of creating reservoirs for the purposes above stated and pursuant to such chapter has in part if not completely created such reservoir system by erecting dams at certain localities especially up and around the vicinity of the Eagle Chain which has increased the storage capacity of the lakes affected thereby to the extent of about two billion or more cubic feet. By reason of this reservoir system it is made possible by the construction of dams and other works in, upon and across the Wisconsin and its tributaries at a point below the said lake region to raise the water in the lakes affected thereby to their maximum level. The waters are gradually released during the summer and fall, thus increasing the efficiency of all the water powers below the point of impounding. Not only is water conserved which would otherwise be wasted over the dams below by two sudden precipitation of the water in the spring but prevents damage and destruction by floods caused by the melting snows rushing down the river at the opening of warm weather.

By the cutting down of the forests along the head waters of the lake regions and by the settling up of the northern country and by aid of artificial drainage the melting snow and moisture finds its way in the river channels much more quickly than when the forests were still in existence and by the sheltering branches prevented a sudden melting of the snow and by their roots held back the moisture. These reservoir systems are calculated to repair the havoc in this respect caused by the denuding of timber. They now hold the water back until needed.

The committee visited the Eagle Chain of lakes and proceeded by launch up the river above the city of Eagle River, passing from one lake into another through thoroughfares connecting the same and learned that nearly 50 square miles of lake area is now accessible by launches where formerly it was very difficult to navigate the thoroughfares by row boats. Summer resorts have sprung up along the lake shores and summer homes have been built by people from various parts of the state and of the United States. Piers have been built into the lakes and other improvements made by the riparian. By reason thereof the shores are beginning to become very valuable and property rights are becoming important. Those living on the lakes, of course, desire the minimum of fluctuation in their shore lines and the water

powers below contrariwise desire water when it is needed by them.

The Wisconsin Valley Improvement Company is practically owned, as we are informed by the water power owners below township 34, by virtue of a certain law passed in 1905 giving such water power owners the right to buy stock in any reservoir system in the proportion which their water power bears to the whole amount of water power below the reservoir system. By virtue thereof the Wisconsin Valley Improvement Company is practically under the control of the water power owners below the reservoir system and they by virtue of their control of the Wisconsin Valley Improvement Company are in a position to wield a tremendous influence on the stream flow of the Wisconsin river because they individually and in their corporate capacity practically regulate and control the Wisconsin river from the mouth to the source.

The Wisconsin Valley Improvement Company has very important powers given them by the act of incorporation. It gives them the right to erect dams and other structures at such points across the streams and for that and all other needful purposes, to take and condemn lands, to collect tolls for logs and boats passing through the locks, dams, chutes of said company, and they may hold back and release water as their own judgment may dictate, subject however to state control. The committee in visiting these waters heard but little if any complaints of any abuse on the part of the Wisconsin Valley Improvement Company in exercising its power thus far; but we believe that a matter of such vast importance to so many people and so many conflicting interests should not be lodged in any one but the sovereign power of the state. There can scarcely be any doubt but what sooner or later in the very nature of things this right of holding back and flooding is likely to be abused. There is but one way of preventing abuse in an enterprise of this kind. The sovereign state should manage and control such a system with due regards of the rights of all.

Bench marks should be established at various points along the shore line of the reservoir system showing the maximum and minimum water levels at which water may be held and further the maximum and minimum flow which may be discharged per day, week or month that may take place should be prescribed. The power, then, of regulation should be in the state and the di-

rect personal supervision of holding or discharging water therefrom should be in some state agent or officer on the ground. If this were done, the establishing of reservoirs on the head waters of all the large streams would be of incalculable benefit to the entire state. It would increase the state revenue by levying toll not only on those who use water for floatables but also by those who enjoy the increased power made possible by such reservoirs. Not only that, but it would decrease the danger of damage and prevent erosion. It would aid in holding back the water and conserve the power until it was needed and could be best utilized.

The legislature of New York in 1907 directed the State Water Supply Commission to investigate this question of reservoir building and they, after a thorough and complete report, unhesitatingly declared in favor of reservoirs built by the state and as a state enterprise and their attitude apparently has the endorsement of Governor Hughes who read their report before the Conference of Governors. Such commission points out the inadvisability of permitting private or corporative interests to do this work and declares that satisfactory results could not be realized by private act.

They point out as reasons why reservoirs should be built that it will decrease damages by floods; it will assure larger minimum flow thus improving sanitary conditions; it will improve navigation and will provide cheaper power for manufacturing purposes and stimulate industry and insure uninterrupted labor in existing plants and further that it will provide a satisfactory annual income to the state.

Their report was thorough and their conclusions accurate. They believe the state would derive enough revenue in a short time to pay for all of the structures.

In Wisconsin the United States government restored to homestead entry all government lands formerly withdrawn for reservoir purposes upon the headwaters of the Wisconsin, Chippewa, and St. Croix rivers. Section 2 of the Act of June 20, 1890, reads as follows: "All the lands restored shall at all times remain subject to the right of the United States to construct and maintain dams for the purpose of creating reservoirs in aid of navigation; and no claim or right to compensation shall accrue from the overflowing of said lands on account of the construction of and maintenance of such dam and reservoir."

Suggestion has been made that a bill be introduced in Congress to assign to the state of Wisconsin all the rights reserved in said Section 2 of the Act of June 20, 1890, by the United States whereby the United States has the right to seize dam sites for purposes of creating reservoirs and flowing lands without compensation to owner of such dam site and lands overflowed. This situation presents to Wisconsin an opportunity which ought not to be lost to the state. By virtue of such assignment the state could create and build reservoirs on the Chippewa and St. Croix rivers without one cent of expense for dam sites or overflowed lands. But unless the constitution is amended by the passage of said joint resolution No. 33, hereinbefore referred to, Wisconsin cannot avail herself of this opportunity.

Unless a special session of the legislature is called the resolution though having passed the session of 1907 and the senate in 1909, unanimously, will become null and void and this will prohibit the state of Wisconsin from entering into an enterprise of this kind and thus the amendment to the constitution may be prevented for many years to come.

Therefore, in our opinion, it is of the first importance, and we recommend again, that the Governor call a special session pursuant to resolution (which was unanimously adopted without opposition) referring this matter to this committee and other things to other committees. By calling such special session and adopting the amendment to the constitution which may mean so much to the future of Wisconsin, the amendment will no doubt be accomplished. That at least was one of the questions referred to this committee on which no difference of opinion was expressed.

In the bill which we submit with this report containing in substance the matters recommended, it is provided that such bill shall not apply to reservoir systems and this for the reason that in the very nature of it, entirely different provisions are necessary and some of these would be inapplicable.

We do recommend, however, that until the state gains the power to create these reservoir systems that any future grants along that line be made with the most careful safeguards that can be devised to enable future legislatures and the state to properly deal with them. The Wisconsin Valley Improvement Company is surrounded by safeguards but we would recommend that all provisions of the bill to create sections 1596a—1596z and

sections 1596a—1 to 1596a—28, inclusive, be made to apply to storage reservoirs so far as the same may be applicable and such other safeguards as wisdom may dictate.

16. In the bill submitted we place the administrative power in the hands of the Conservation Commission, a bill for which is to be introduced by other members providing for the consolidation of several state departments. The placing of this in the hands of the Conservation Commission is tentative on the part of the committee and provides that in case such conservation commission is not organized, such power is devolved on the Railroad Rate Commission. Such administrative power should be placed in such department as may most effectively execute the same.

BILLS OFFERED.

We offer the following bills pursuant to the resolution and submit the same to the consideration of the legislature as embodying in concrete form the recommendations herein made. The bills are three in number and their respective titles follow:

1. A bill to create sections 1596a to 1596z and 1596a—1 to 1596a—28, inclusive, of the statutes, relating to the erection and maintenance of dams in and across navigable streams for the improvement of the navigation thereof and the development of water powers thereon; and providing for the imposing and collecting of an annual franchise fee therefor.

2. A bill to amend section 1596 of the revised statutes of Wisconsin, prohibiting the building of any dam, bridge or other obstruction in or over any navigable stream without the permission of the legislature.

3. A bill to create sections 1494—65 to 1494—68, inclusive, of the statutes relating to the burning of slashings, limbs, tops, and refuse of pins.

All of which is respectfully submitted.

PAUL O. HUSTING,
HENRY KRUMREY,

Senate Members of the Joint Special Committee
on Water Powers, Forestry and Drainage.

Dated at Madison, Wis., January 24, 1910 A. D.

REPORT ON FORESTRY.

In 1905, through the enactment of Chapter 264, the State took the first step towards a broad and comprehensive policy to gradually acquire adequate forests reserves at the headwaters of the most important rivers of the state. This law withdrew from sale and set aside for forest reserve purposes all state lands north of town 33, and the most effective provision of the bill was that the state board of forestry might dispose of the agricultural and scattered lands, not suitable for forestry, the proceeds of such sales to constitute a "forest reserve fund" to be available for the purchase of lands to be added to the forest reserves.

The State lands north of town 33, which remained unsold in 1905, were so badly scattered that they could not be systematically managed as forest reserves, or adequately protected from fire and timber trespass. The state forester, therefore, after examining the lands and consulting with the higher officers of the U. S. Forest Service, recommended to the state board of forestry that the main forest reserve be located in the wonderful lake region, lying at the headwaters of the Wisconsin and Chippewa rivers in Oneida and Vilas counties, and that the agricultural and scattering lands in other counties should be appraised and sold, at public sale, at such times as the lands and timber could be disposed of to the best advantage. In 1905, the state lands in Oneida and Vilas counties comprised 50,346 acres, and up to January 1st, 1910, the state board of forestry have purchased 58,218 acres in these two counties, so that the present acreage is 108,564 acres. In addition to these lands there are some 35,656 acres in Forest county, 29,174 in Iron county, and 27,634 acres in Price county, most of which will be retained within the permanent reserves, so that the foundation of our future forest reserves is now 201,028 acres. There remain some 71,364 of agricultural

and scattered lands to be disposed of in other counties, and they will be offered for sale as general business conditions warrant.

The sale of these remaining lands, however, will not begin to provide sufficient funds to purchase the lands which is absolutely necessary to procure in order to block up the reserves and thus make forestry management possible. As previously stated, the lake region in Oneida and Vilas counties, at the headwaters of the Wisconsin and Chippewa rivers, is very unusual in the number, extent and beauty of the lakes. Those lakes also have a very important economic value, for if the forest growth upon their watersheds is protected, and some of the lakes also used as reservoirs, the flow of the rivers rising in this region can be made remarkably uniform, and thereby the value of these rivers, both in the development of power and for any possible future needs of navigation, will be assured to the people of the state for all time.

But this lake region, which is such a valuable asset to the state, cannot be protected until the necessary lands are acquired and placed under forestry management. The cut over lands which are adjacent to, and mixed in among, the state's holdings, owned largely by non-residents and uncared for, are a serious and constant menace to the forest reserves, as they are the source from which start many of the destructive forest fires. The truest economy on the part of the state will be to acquire these lands as soon as possible, so that the young growth which is coming up may be protected and denuded lands reforested.

The state board of forestry has secured the 58,218 acres, already purchased in this region, at the very low average price of \$2.50 per acre, but timbered lands which should be secured to protect the shores of the rivers and lakes, and which will prove to be most profitable investments, cannot of course be purchased at such a low figure. The state board of forestry has, during the past five years, examined the acres which should be purchased and it has been found that the state should own and control at least 2,000,000 acres in forest reserves. It is the intention to appoint forest rangers who will live in the reserves, act as fire patrols to prevent the setting or spread of forest fires, build fire lines, roads and trails, plant acres which have been denuded, and scale the mature timber which is cut from reserve lands by the purchasers.

As stated, the lands necessary to block up the reserves should be purchased as soon as possible, and an executive organization per-

feeted so that the reserves shall be brought into condition to yield an increasing revenue to the state. We therefore recommend as an urgent necessity the passage of bill No. 502, S., so amended as to provide a state tax of two-tenths of one mill for each dollar of the assessed valuation of the taxable property in the state, to be collected annually for a period of twenty years, the tax when levied and collected to constitute "a forestry investment fund," to be used for the purchase, improvement and protection of forest reserve lands. Such a tax, of two-tenths of one mill, will make it possible for the state board of forestry to at once enter into land contracts to secure the lands which are needed and to pay for them as the money becomes available.

This may appear to be a large sum to devote to forestry work, but it should be remembered that the purchase of forest reserve lands will be a most excellent investment for the state for the following reasons :

1. The young timber on the reserves will be protected and denuded acres planted so that in future years the state will receive a direct and increasing revenue from the sale of mature timber which can be cut and removed from time to time, and at the same time improve the character of the forest.

2. Indirectly the state will receive even a greater revenue by retaining industries within the state which will become more and more dependent upon the forest reserves for raw material as the forests are cut off of private lands.

3. In the same way the state will gain an indirect revenue from the preservation and improvement of the water powers, which will be assured by extensive forests at the headwaters.

4. Preserving the forests in the beautiful lake regions of northern Wisconsin will both protect and greatly enhance its present attractiveness as a resort region for not only the citizens of this state but the entire Mississippi Valley as well. The value of such a resort region is not generally understood, even from the dollar view-point, but the report of the Bureau of Labor of New Hampshire for 1905 shows that the resort business yielded in that year over \$10,000,000, and the report of the Forest, Fish and Game Commission of New York for the same year states that it was over \$7,000,000.

If we protect our lakes, rivers and forests in northern Wisconsin they will attract summer visitors from all over the country, and not only will the settlers have a near and ready market for

all they can raise, but a large amount of money will be paid to hotels, boarding houses, resorts, guides, etc.

A small section of the reservoirs should also be set apart for consumptives, where they can live a healthy life in the bracing air of northern Wisconsin, and those who are in need of financial assistance be given enough light work, such as planting, to at least pay for their keep. In time it will also be desirable to set apart a portion of the reserves as a bird and game preserve.

PILING AND BURNING PINE SLASH.

The urgent necessity of protecting the remaining forest resources of the state is clearly apparent to every well informed man, and it is freely admitted on all sides that fire is the greatest enemy to the forest. Vast areas in Wisconsin which were formerly covered with magnificent forests have been reduced to almost barren wastes, and the chief reason these fires have been so destructive is the fact that they were fed by the enormous accumulation of slash left on the ground after lumbering operations. The forest fire problem can never be entirely solved until the slash is either utilized or disposed of. In order to determine exactly the results accomplished by slash burning the committee visited the Minnesota National Forest, at Cass Lake, Minnesota, October 24th and 25th, 1909.

The committee spent two days in looking over the forests and in the evenings testimony was taken from forest officer, lumbermen and loggers as to the cost of slash piling and burning, and its effectiveness in preventing disastrous fires. Logging operations, under forestry regulations, have been carried on for six years, and in that time 275,000,000 feet of pine had been cut, composed of about 60% white pine and 40% Norway pine. All the slash resulting from the cutting of this timber has been piled and burned, and Mr. Marshall, supervisor, testified that it had cost from 15 to 30 cents per M. feet of logs. The Standard Lumber Company, of Dubuque, let contracts for this work at 24 cents and the testimony of other lumbermen and loggers was that it sometimes cost nothing, as the logs could be skidded much more easily with the slash out of the way, and that it never cost over 50 cents, even when a considerable amount of small hardwood was piled and burned, which was cut in making roads. It was testi-

fied that the best method was to build a fire and burn up the slash as fast as it accumulated, so as to keep it out of the way of the skidders and obviate the necessity of piling it and burning at some later time. The testimony of all those who appeared was that the burning of pine slash prevented severe forest fires, and so saved both the timber which was left standing and the young pine which comes up after logging.

The committee found on their trips through the forests that the reproduction of both white and Norway pine was magnificent, and that forest fires are easily handled when the slash is disposed of.

A small number of patrols watch the forests during the dry months to see that no fires start, and as the fires are surface fires and burn slowly on account of the absence of slash, a few men can easily handle them. As the results of pine slash burning were found to be so beneficial, and the cost moderate, we recommend the passage of Amendment No. 2, to Bill No. 468, S., which provides for the piling and burning of white, Norway and jack pine slash in Wisconsin.

UTILIZATION OF WOOD WASTE.

On October 19th, 1909, the committee visited Hackley, Wisconsin, to look over the Big Twin Lake reservoir, and to examine the chemical plant for the utilization of wood waste, which is owned and operated by the Hackley-Phelps-Bonnell Company. The committee saw the hard-wood which was cut and went through the chemical plant under the guidance of Mr. Chas. A. Phelps, who explained the process. Mr. Phelps testified that after the saw log timber had been cut and removed from the forest, that wood choppers worked up all the remaining hardwood, taking all defective and small trees, unfit for saw logs, and all limbs down to 1½ inches in diameter, and that from this material, which usually would be wasted, charcoal, wood alcohol and acetate of lime was made. He testified that after the hardwood tops and limbs had been worked up by the wood choppers, and removed from the forest, that there was not enough slash left on the ground to cause a severe forest fire.

Mr. Phelps testified that one cord of wood will produce 60 bushels of charcoal, 10 gallons of wood alcohol, and 145 pounds of

acetate of lime. The committee inquired as to whether it would be possible for hardwood operators who are not able to build chemical works to ship their hardwood refuse to chemical works at some distance and Mr. Phelps was of the opinion that it could be shipped profitably to a distance of from 80 to 100 miles.

It is felt that the lumbermen of Wisconsin, who are operators in hardwoods, should carefully consider this utilization of their wood waste as they will thus not only secure useful and valuable by-products but also materially lessen the danger from the fire hazard of slash in the forests.

FIRE WARDENS AND FOREST PATROLS.

The present state fire warden law provides that the state forester may appoint one or more town fire wardens in such towns as he may deem necessary. During 1909 some 500 fire wardens were serving in towns containing a considerable amount of woodlands, particularly in the northern part of the state. Under the law those fire wardens receive no salary, but are paid by the towns such a sum as the town board may allow, which shall not exceed 25 cents per hour, for the time actually employed in posting fire warning notices, calling out citizens to assist them, and in fighting fires. These town fire wardens have done excellent service in getting the settlers in their towns to use much more care in setting fires and in putting out forest fires when they occur. The year 1909 witnessed a marked improvement in the care in which settlers used fire in clearing land, and this was undoubtedly due in large measure to the enormous losses of 1908, when some 1,209,432 acres were burned over, with a total loss of nearly \$10,000,000.

Records of the fire warden service for the past five years show that from 60 to 70% of all fires reported by the wardens are caused by settlers in using fire as a means of clearing land and disposing of brush. The present law provides that in a dangerously dry season the fire wardens shall post special warning notices, and that while these notices are posted no fires shall be set. It is impossible, however, to provide any means by which all the settlers in any town will see these notices, and it is extremely difficult to enforce their strict observance of this portion of the law. We therefore recommend that the law should be amended so as to provide that no fires shall be set for burning brush or clearing

land, from April 1st to December 1st, without the written permission of a fire warden, forest patrol or other forest officer. It can easily be arranged so that any settler can secure such a permit to use fire during a safe period, and it is time that the very heavy annual loss from fires, due so largely to the indiscriminate setting of fires should be stopped.

Many of the town boards do not as yet fully appreciate the great ultimate loss to their community from repeated forest fires, and they are not extending to the fire wardens the hearty support in their difficult work which is absolutely necessary in order to accomplish the best results. We therefore believe that the fire wardens should be appointed for the county, instead of the town, and so recommend. In this way the fire warden system can be greatly strengthened, but it should be apparent that the main point in the forest fire problem is to prevent the starting of fires, and that the machinery for putting them out, though it must be solved, is yet of secondary importance.

Upon the national forests in the western states the federal government employs forest rangers, or patrols, and one of their chief duties is to patrol their districts during dry weather and not only do they take every means to prevent the setting of fires but they put out small fires before they become dangerous or difficult to handle. Before the forest ranger system was organized the annual loss from fires upon the national forests had been very heavy, but as soon as the organization was in working order the losses were quickly checked and for the last few years they have been only an insignificant percentage of the total area.

The same result has been the history of the organization of forest fire patrol system by the lumbermen of the west, to protect their own timber. Very strong associations have been formed by the lumbermen, notably in Idaho, Oregon, Washington and California, and their losses have been very small, with an approximate expenditure of 2 cents per acre per annum, which is certainly a cheap means of insurance.

In Wisconsin, however, it is almost an impossibility for private timberland owners to protect their property by means of a patrol, for the reason that timberlands are widely scattered, and even though an owner might provide a patrol for his own holdings, still fires which he could not control would be almost certain to start on adjoining cut-over or wild lands. It would therefore seem the duty of the state to organize and pay for a patrol

system which should be composed of only a few competent woodsmen in ordinary seasons, with an auxiliary force which could be called out in case of necessity.

We recommend, therefore, that the state board of forestry be authorized to employ such patrols and to pay for the same out of the proceeds of the levy of a state tax of two-tenths of a mill, which we have previously recommended for the purchase, improvement and protection of the state forest reserves.

SUMMARY OF RECOMMENDATIONS.

1. The passage of bill No. 502, S., so amended as to provide a state tax of two-tenths of one mill for each dollar of the assessed valuation of the taxable property in the state, to be collected annually for a period of twenty years, the tax when levied and collected to constitute "a forestry investment fund" to be used for the purchase, improvement and protection of forest reserve lands.

2. The passage of amendment No. 2, to bill 468, S., which provides for the piling and burning of white, Norway and jack pine slash in Wisconsin.

3. To the careful consideration of the lumbermen of the state of Wisconsin the utilization of hardwood slash by means of chemical plants.

4. The employment of an efficient fire patrol by the state board of forestry.

DRAINAGE.

There have been referred to us bills on drainage, and the important change suggested by the bills referred to us, is, whether or not the navigable rivers and lakes of the state may, under certain circumstances, become auxiliary to drainage schemes. In short it may be said that the bills proposed seek to bring about a change in the statutes to overcome the decisions of the supreme court which declare that the drainage commission, under the law, as it exists, has no power to destroy and impair navigable waters for the purpose of furthering drainage schemes. The first comprehensive drainage law was passed prior to 1891, which law was declared invalid because it did not make the power to condemn land depend upon the fact that the work to be done was necessary or desirable to promote any public interest, convenience or welfare. The next important drainage law was passed in 1891, known as chapter 401, and now known as section 1397—11 to 1397—39, which was designed to cure the objections in the former law. That law was never declared unconstitutional, but was amended from time to time, and in 1905, another complete codification of the law was made, covering the entire subject, which law is now in effect.

It was sought at that time to amend section 1379—22, which delegated to commissioners the right to "clear out and remove obstructions from natural and artificial channels of streams within the limitation of the drainage district" and to condemn lands and mill ponds and water powers, by making the law applicable to navigable streams as well as to natural or artificial channels or streams. The legislature at that time refused to extend the same to navigable streams and left the law the same in that respect when they passed chapter 419, laws of 1905.

Notwithstanding that the legislature refused to make the law applicable in terms to navigable streams, it was still contended that such law applied to navigable as well as non-navigable streams and the question was decided by the supreme court in *re Horicon Drainage District*, 136 Wisconsin, 227.

The court decided that it could not hold that any law authorized the impairment or destruction of the navigable waters in the furtherance of drainage, unless the legislature would delegate such power in the most unmistakable terms. Some doubt is intimated in the decision as to the *power* of the legislature to delegate any such authority.

In that same case, MARSHALL, J., filed a supplemental opinion in which he declared that the legislature had no constitutional power or authority to permit the destruction and impairment of navigable streams for drainage purposes. In delivering the opinion, among other things, he said: “* * * While the reclamation of waste lands is important and the preservation of the navigable waters of the state as a matter of public policy is of paramount importance, it were better to create more inland bodies of navigable water than to destroy those we have, even if the right of destruction exists. * * * It is proper to say in passing, that whether the legislature could authorize the destruction of a navigable lake is so very doubtful that it were better not to say anything liable to be construed as suggesting the existence of such power. Generally speaking, a trustee can never rightfully destroy the subject of the trust, even by the consent of the *cestui que trust*, if thereby the dominant purpose of the donor would be defeated. Why the great trust under which the public waters of the state are held is not governed by that rule, is difficult to perceive.” The highest judicial authority of the state has emphasized repeatedly the trust capacity of the state in the preservation of the navigable waters of the state in trust for all the people and has stated in the plainest terms that the state could never betray that trust.

In addition, as we have just seen, MARSHALL, J., expresses very grave doubts of the *power* of the legislature to abdicate such a trust by legislation.

For such reasons alone, namely, that the state, though possibly having the *power*, has not the *right* to pass laws impairing or destroying the navigable streams, and further, as one judge has said, there are grave doubts of the constitutional power of the

state to pass such laws, it would seem to be extremely unwise to attempt to give anyone the power to destroy or impair navigable waters under color of drainage. But in addition thereto it may be pointed out that the state is embarking or is about to embark upon a system of the conservation of our navigable rivers and lakes and the water powers thereof. The navigable streams of Wisconsin are immensely valuable for water powers, and storage reservoirs are being built to hold back the flood waters for the purpose of increasing the efficiency of the water powers. Drainage has for its object the hurrying away of the waters. Drainage is repugnant to the conservation of waters. Conservation means the saving of waters and drainage means the wasting of them. The state must declare what its paramount policy is to be, so far as the navigable waters of the state are concerned, namely, drainage or conservation, and consistently pursue that policy adopted. By refusing to permit the destruction of navigable rivers and lakes for drainage purposes, it does not follow that lands may not be drained; they may still be drained under our drainage law as it now stands, but subject to the condition that navigable waters of the state must not be destroyed. We favor every amendment to the drainage laws which will promote their efficiency, but oppose any amendment to the law which extends the powers of drainage commissioners to navigable rivers and lakes, and to such an extent we oppose any amendment to the law. As the law now stands those desiring drainage have full and complete authority to drain marshes.

QUESTIONS SUBMITTED TO WISCONSIN WATER
POWER OWNERS AND LESSEES, BY LEGISLA-
TIVE COMMITTEE ON WATER POWERS,
FORESTRY AND DRAINAGE.

1. State name of corporation.
2. Date of organization.
3. When was franchise secured from the legislature?
4. If franchise was purchased, state from whom and sum paid therefor.
5. What is the present location of corporation?
6. From what river is power derived?
7. Give list of officers and directors with office held by each.
8. What is the capital stock of the corporation?
9. What is the nature of its business?
10. Is the corporation owner or lessee of water power? If lessee, state name of lessor.
11. If lessee, state when power was first leased and the amount paid per annum per horse power.
12. State dimensions of dam, and of what material it is built.
13. What is the amount of the fall?
14. State average daily flow in hydraulic feet per second at both high water and low water periods.
15. What is the average amount of unused power at both high water and low water periods on your level?
16. State approximately the undeveloped horse power on the stream where plant is located.
17. State amount of developed and undeveloped horse power owned by corporation.
18. What is the total horse power of water power used per annum?
19. If steam power is used in connection with water power, what is the total amount of steam power used per annum?

20. What is the specific purpose to which the water power is devoted?
21. What is the total output of manufactured product per annum? If reporting on more than one plant, state each separately.
22. What is the value of the output of the corporation per annum?
23. If power is leased to others, what is the gross and net income derived therefrom per annum, and what is the amount per horse power charged for water and for steam separately?
24. Does the corporation sell power, and if so, what quantity per annum and to whom?
25. If power is sold to public utilities, state the amount per annum charged for water and steam separately.
26. If power is sold to municipal corporations, state the amount per horse power charged per annum for water and steam separately.
27. If power is sold to private individuals, state the amount per horse power per annum charged for water and steam separately.
28. For what purposes is power sold?
29. State amount of expenses charged up for power per annum.
a. Steam. b. Water power.
30. What is the monthly payroll of the corporation?
31. If steam power is used in connection with water power, state the cost of coal at point of location of plant.
32. In connection with the operation of the plant, what expenditure is made per horse power produced? a. Steam? b. Water power?
33. Do you own flowage rights, and if so, state their nature and how they were secured, whether by purchase or otherwise.
34. What is the cost of erection and equipment of dam and water power including flowage rights?
35. What is the cost of maintenance of plant?
36. State difference in cost of manufacture as between water power and steam power.
37. To what extent, if any, does plant afford a market for forest products which would otherwise be unmarketable?
38. Where does the raw material used in plant come from?

39. What amount is set aside annually on account of depreciation of the property?
40. Is reservoir a practical necessity? If so, state reasons.
41. To what extent, if at all, has the reservoir system been developed on stream?
42. If the reservoir system is already partially or fully developed, state the percentage of increased efficiency resulting therefrom.
43. Enumerate transportation facilities of corporation.
44. Give estimate of the enhancement in the value of property in the vicinity of the plant in dollars and in percentage, due to the development of the water power.
45. What is the assessed value of the property owned by the corporation?
46. Give actual value of same.
47. If water power franchise is assessed separately, state amount of assessment.
48. What proportion of the taxes of the village, town or city in which plant is located is paid by corporation?
49. If the water power is bonded, state amount of bonded indebtedness.
50. Is there any agreement between your company and any other water power company, either as owner or lessee, to regulate or control the water power in your vicinity or within this state, either as to valuation or horse power or otherwise? If so, state the nature of this agreement.

PROPOSED BILLS.

A BILL

To create sections 1596a to 1596z and sections 1596a—1 to 1596a—28, inclusive, of the statutes, relating to the creation and maintenance of dams in and across navigable streams, for the improvement of the navigation thereof and the development of water powers thereon; and to provide for the imposing and collecting of an annual franchise fee therefor.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. There are added to the statutes fifty-four (54) new sections to read:

Section 1596a. Every franchise heretofore or hereafter granted for the erection and maintenance of dams in and across any navigable stream of this state for the improvement of navigation and development of water power, and any other public purpose, is granted subject to the conditions hereby or hereafter imposed by the state.

Section 1596b. Every franchise for the erection and maintenance of dams in and across any navigable stream of this state for the improvement of navigation and the development of water power and any other public purpose, is accepted, taken and held subject to the conditions and terms hereby or hereafter imposed by the state, and is so accepted, taken and held in consideration of the powers, privileges and prerogatives conferred by such franchise.

Section 1596c. The use of water in navigable streams and lakes for power developed under a franchise from the state, is hereby declared to be a public use.

Section 1596d. All of the energy developed or undeveloped of the water in the navigable streams of the state is subject to the control of the state for the greatest public good.

Section 1596e. The beneficial use and natural energy of the water of the navigable streams and lakes of this state for all public uses belongs to the state in trust for all of the people.

Section 1596f. Every franchise for the erection and maintenance of any dam in or across any navigable stream granted prior to the passage and publication of this act, and which is subject to repeal, is hereby repealed, and all franchises for the erection and maintenance of any dam as herein provided shall be granted subject to the provisions of this act.

Section 1596g. The term "franchise" as used in this act shall mean and embrace every legislative act heretofore or hereafter passed granting to any person, firm or corporation, their heirs, executors, administrators, successors, assigns or lessees, the right to erect and maintain a dam in and across any navigable stream of this state for the purpose of improving navigation, to facilitate log driving, the development of water power, or for any other public purpose.

Section 1596h. The term "appropriator" as used in this act shall mean and embrace every person, firm or corporation, their heirs, executors, administrators, successors, assigns, lessees, trustees, or receivers appointed by any court whatsoever, who have, hold, take or accept any franchise for any of the purposes enumerated in section 1596g.

Section 1596i. Every appropriator under an existing franchise, hereby repealed, shall within one (1) year after the passage and publication of this act, file with the conservation commission a written application for a franchise to maintain any dam heretofore erected and maintained by said appropriator. The provisions of section 1596s shall not apply to any such appropriator. Upon receipt of such application the conservation commission shall make an examination and investigation of such dam and shall make and file a report and findings based upon such examination and investigation in the office of said commission, and shall cause to be served a written copy of said report and findings upon the said appropriator. A copy of such report and findings shall be filed with each branch of the legislature at the next succeeding session thereof. Such report and findings shall include

a determination by the said commission of the franchise value of the horse power developed or created by said dam.

Section 1596j. Within one (1) year after the receipt by the appropriator of the report and findings provided for in section 1596i, the said appropriator shall file with the conservation commission and with the secretary of state a written acceptance, legally executed of a franchise embodying the franchise value of a horse power as determined upon by the conservation commission, and all the terms and conditions provided for in this act. Thereupon the said appropriator shall by operation of law receive, have and hold a franchise subject to all the terms, conditions and provisions of this act. And such written acceptance shall include an acceptance of the determination of the conservation commission as to the franchise value of a horse power, and said appropriator shall pay an annual franchise fee as provided in sections 1596n and 1596o. Said appropriator may appeal from the determination of the conservation commission fixing the franchise value of a horse power, in which case the written acceptance herein provided for shall be filed subject to the determination by the court appealed to. If any such appropriator fails to file his written acceptance as herein provided, the franchise held by such appropriator shall be null and void and the dam and water power privilege thereunder shall be subject to reappropriation and condemnation as provided in this act.

Section 1596k. Every franchise granted pursuant to this act shall be granted for the purpose of improving navigation and for the development of water power and for any other lawful public purpose.

Section 1596l. Every appropriator who accepts, takes and holds a franchise granted pursuant to this act is hereby given the right to lease and dispose of to the public, any power necessarily or incidentally developed under such franchise.

Section 1596m. Every appropriator who accepts, takes and holds a franchise under the provisions of this act is hereby declared to be a public utility and shall be subject to all the provisions of law relating to public utilities, except as herein otherwise provided and not inconsistent herewith or repugnant hereto.

Section 1596n. After the passage of this act, every appropriator who shall appropriate the use of the water of any navigable stream under the provisions of this act shall, during the life of such appropriation, as fixed by the franchise creating authority

to so appropriate, pay to the state of Wisconsin not less than ten (10) cents nor more than two (2) dollars per annum, on or before the first day of February of each year, for the franchise value of each and every horse power represented and put to beneficial use by the said appropriator, during the year ending December 31st, next preceding. The franchise value of each and every horse power means the difference in cost between the production of a horse power by water power and the production of a horse power by steam power, at the same place, in like quantities and under like circumstances.

Section 1596o. The amount of the payment provided for in section 1596n shall be ten (10) per centum of the franchise value of each and every horse power put to beneficial use, subject, however, to the provisions of section 1596n. The value of such horse power shall be determined by the conservation commission, and such valuation shall be readjusted at the end of the twenty year period and at the end of each ten year continuance, hereinafter provided for, and at no other time. The conservation commission shall take as its basis for value horse power operated ten (10) hours per day.

Section 1596p. In ascertaining such value the said commission shall take into consideration the uniformity of the flow of the stream, the number of horse power developed and capable of development and put to beneficial use or capable of being put to such use, the load factor, the accessibility of the market and the use or uses to which the power developed is or may be put.

Section 1596q. For the purposes of this act, a horse power is hereby defined as five hundred fifty (550) pounds of water per second of time for each foot of available fall.

Section 1596r. Such appropriator shall pay the conservation commission the annual franchise fee. Immediately upon the receipt of such annual franchise fee, the conservation commission shall pay the sums over to the state treasurer, taking his receipt therefor, to be placed in the general fund of the state treasury.

Section 1596s. Every applicant for a franchise except as hereinafter provided, shall file with the conservation commission a statement and records showing the following:

1. A description of the land by metes and bounds upon which it is proposed to locate said dam or dams and the appurtenances thereto.

2. The use or uses to which the water and power is to be applied.

3. The ownership of all land or lands which will be overflowed and which will otherwise be necessary to the use and operation of such dam for the purposes specified.

4. The number of horse power to be developed by the proposed dam.

5. A survey and complete plans and specifications showing the dams, weirs, tunnels, races, flumes, sluices, pits and other structures of works which it is proposed to build or make in connection therewith.

6. Such additional and other information as shall be prescribed by the conservation commission.

Section 1596t. Upon receipt of such application and statement of the applicant as provided in section 1596s, the conservation commission shall, within a reasonable time, make an examination and investigation of the premises and the proposed water power, and said commission shall make a report of its investigation and examination and its findings based thereon and file the same in the office of the conservation commission. A copy of such report and findings shall be filed with each branch of the legislature and shall contain its findings as to the value of the horse power, when developed and operated, as provided in section 1596e, and also a finding as to the best site, describing the the same by metes and bounds, for said dam, and also detailed information required by law or which the said commission may have in its possession.

Section 1596u. No person, firm or corporation shall hereafter erect or maintain any dam in or across any navigable stream unless such person, firm or corporation shall first be granted a franchise by the legislature as provided in this act.

Section 1596v. No franchise to erect or maintain any dam in or across any navigable stream under the provisions of this act, shall be granted for a longer term or period than twenty (20) years, but the appropriator shall have a right of continuance of such franchise for two (2) further and successive terms of ten (10) years each upon filing an application with the conservation commission.

Section 1596w. Upon filing the application provided for in section 1596v, at the conclusion of the twenty year period, the

franchise granted to such appropriator shall be continued for a period of ten years and the like filing of an application at the end of the first continuance shall continue the franchise for an additional period of ten years, upon such terms and conditions as the laws applicable, in force and effect at the time of the particular continuance, may provide.

Section 1596x. The building of the dam authorized by the franchise shall be commenced in good faith within four (4) years from the date of the granting of the franchise.

Section 1596y. When so built and constructed such dam shall be maintained and operated continuously, and the maintenance and operation thereof shall not be discontinued or cease for any length of time exceeding two (2) years at one time.

Section 1596z. The water power acquired under and by virtue of said franchise shall not be operated or its operation suspended pursuant to any contract, agreement or understanding, express or implied, in violation of any law of this state or of the United States.

Section 1596a—1. Any person, firm or corporation upon application and making proper compensation therefor to said appropriator, shall have the right to use for any lawful purpose any of the surplus or unused power or the accumulation of water produced or created under such franchise.

Section 1596a—2. The appropriator shall not charge or collect more than a reasonable rate for any power or accumulation of water let, sold or disposed of by him. In case the appropriator and the applicant for the use of or the lessee of any part of said power or accumulation of water, shall be unable to agree upon the rate to be paid or other conditions leading up to the use of the same by such lessee, they shall submit the matter or matters to the conservation commission, which commission shall hear and determine the questions of reasonable rate or other questions pertaining to the leasing or letting of said power or water, subject to the right of appeal by either party as hereinafter provided.

Section 1596a—3. The refusal of any appropriator to submit to the conservation commission any question as provided in section 1596a—2, or his failure to furnish such power on accumulation of water at the rate fixed by the said conservation commission, if such power or accumulation of water is not needed for use by the appropriator and his lessee or lessees; or his failure

to comply substantially with any of the conditions of the franchise, shall terminate and forfeit the franchise granted; and failure of the lessee of such power or accumulation of water to submit the questions provided in section 1596a—2, or after submission, to pay the price determined by said conservation commission and approved by the courts, shall work a forfeiture of his lease of such power or accumulation of water.

Section 1596a—4. After a hearing and a determination by the conservation commission of any question presented to said commission under any of the provisions of this act, either party shall have the right of appeal as hereinafter provided. However, all appeals from such determination by the conservation commission shall be made and perfected within sixty (60) days after the conservation commission shall have served a copy in writing of its determination of the question or questions presented to said commission upon the parties, and, in case of no such appeal is taken or perfected, the determination of the conservation commission shall be binding and conclusive upon all parties.

Section 1596a—5. Every appropriator shall develop and use, within a period or periods to be named in the franchise, a specified quantity or quantities of power, estimated in horse power.

Section 1596a—6. If the quantity of power required by the franchise to be developed within a period or periods named is less than the full capacity that may be developed under the franchise, the conservation commission, (subject to the right of appeal on the part of the appropriator, as hereinafter provided,) may require the appropriator to develop the full capacity of power that can be developed under said franchise within the period or periods of time named in the said franchise.

Section 1596a—7. Any appropriator, upon demand by the conservation commission or the legislature, shall produce all books, accounts, records and statements, verified by affidavits, showing the cost of flowage rights, construction, equipping and maintaining the necessary dams, weirs, tunnels, races, flumes, sluices, pits and other structures or works for the development of power under such franchise and the delivering of the power therefrom, and when requested to, said appropriator, his agents and servants, his lessee, or any person in the employ of either, shall appear and give testimony in regard thereto.

Section 1596a—8. For the purpose of ascertaining the quan-

tity of power actually developed or capable of development, or the amount of compensation payable under any franchise, or for any other lawful purpose, said conservation commission or any engineer or other person appointed by said commission for that purpose, shall have free access to all parts of the buildings, structures and grounds utilized by said appropriator under such franchise, and all books, plans or records bearing on the quantity of power, and may take any measurements and observations; and any calculations as to the quantity of power developed or capable of development, or any other calculations made by said conservation commission or by such engineer or other person, shall, subject to right of appeal as hereinafter provided, be binding on the appropriator.

Section 1596a—9. During the construction of the dam and other structures under the provisions of this act, and at all other reasonable times, the conservation commission or any engineer or other person appointed by said commission for that purpose, shall have free access to all parts of the premises, buildings and structures to inspect the same and to acquire information for all purposes of this act.

Section 1596a—10. All dams shall be provided with a sufficient fishway or fishways, to be approved by the conservation commission, and such fishway or fishways shall at all times be kept and maintained in good repair and open for the free passage of fish; and all such dams shall be provided and maintained with all necessary slides, chutes, guide booms and piers for the passage of logs and timber and other floatables over and through the same, so that the same shall not injure or obstruct navigation of the stream.

Section 1596a—11. Every stream, navigable for commercial boats and crafts, in or across which a dam is erected or maintained, shall be equipped and maintained by the appropriator with a lock of a size and form of construction to be approved by the conservation commission sufficient for the passage of all commercial boats and other craft that may be used in navigating the stream, and such lock shall at all times be maintained in good repair and working order.

Section 1596a—12. During the continuance of the franchise, the appropriator shall keep and maintain all dams, weirs, tunnels, races, flumes, sluices, pits and other structures and works

necessary for the enjoyment of such franchise in good repair and condition, and shall not wilfully or otherwise injure or destroy the same or any part thereof, but at the expiration or sooner termination of the franchise, shall leave all such structures and works in good repair and condition, reasonable use and wear thereof and damage by fire and tempest only excepted, and so that the subsequent usefulness of such structures and works shall not be lessened by any act of said appropriator.

Section 1596a—13. In order to build and maintain any dam and use the same for the purpose or purposes specified, any appropriator shall have the right to take and overflow and use any lands or riparian rights not owned or controlled by him and may acquire title to any such lands or riparian rights and the right to control and use the same for said purposes by and through proceedings of condemnation under the power of eminent domain as provided in sections 1777a, 1777b, 1777c, 1777d, and 1777e of the statutes, and laws amendatory thereof.

Section 1596a—14. The power and authority of the state to acquire water powers and works by purchase, lease or condemnation proceedings upon the basis of value provided in section 1596a—19 of this act or otherwise, under proper constitutional restrictions and provisions, is reserved.

Section 1596a—15. The state expressly reserves the right, as the best interests of the public may demand, to manage, regulate and control, from time to time, the use and distribution of the power created, generated or produced by any appropriator under a franchise from the state.

Section 1596a—16. At the expiration or sooner determination of the franchise, all rights under the franchise, exclusive of the physical property, shall revert to and become the property of the state in trust for all of the people. The appropriator shall be allowed a reasonable time, to be fixed by the conservation commission, in which to remove all machinery employed by him in the development and use of the said water power privilege, failing such removal, such machinery shall be subject to condemnation and appropriation as herein provided.

Section 1596a—17. All franchises granted under this act shall at all times be subject to any general regulation by the legislature, affecting the construction and operation of the works for the improvement of navigation, the development of water privilege or the supply of power therefrom.

Section 1596a—18. The failure of any appropriator to pay the annual franchise fee provided for within ninety (90) days after the same is due and payable; or the failure to perform the conditions as to the construction of the work or the development or supply of power, at any time after the water power privilege has been developed, or the failure, effectively, to produce power from the said privilege, either for his own, or the use of other persons, in substantial compliance with said privilege, (unless hindered by unavoidable accident); or the failure to comply with any of the provisions of section 1596z, or, the failure in any other respect, substantially to comply with the terms of the franchise and provisions of this act, shall cause a forfeiture of the franchise and upon proper suit brought by the attorney general, such franchise shall be forfeited and terminated and the said water privilege shall thereupon be subject to reappropriation.

Section 1596a—19. If the appropriator shall fail to reappropriate, or if the franchise of said appropriator is terminated or forfeited as provided in this act, such dam and water power privilege shall be subject to reappropriation, and any person, firm or corporation granted a franchise to appropriate such dam and water power privilege, shall have the right and power, by and through condemnation proceedings under the power of eminent domain, to take and acquire title to all lands and flowage rights, dams, weirs, tunnels, races, flumes, sluices, pits and other structures or works erected or acquired by the retired appropriator on connection with or appertaining to said dam and water power privilege; provided that in said condemnation proceedings the basis of value for all property so taken shall be as follows: The actual value *at the time of the granting of the franchise* to the retired appropriator of all lands, necessary and used under the franchise, exclusive of all buildings, dams and other structures; and the actual value of all buildings, dams and other structures; *at the time of said condemnation proceedings*, necessary and used in the operation of said water power privilege. No compensation or allowance shall be made or given to such retired appropriator for any franchise right or good will under such franchise.

Section 1596a—20. If any appropriator shall fail to pay any annual franchise fee, the state shall have a preference lien therefor, prior to all other liens or claims, except for taxes, upon all

property of the appropriator used in connection with such appropriation, and upon notice from the conservation commission, the attorney general shall proceed to foreclose the lien and collect any unpaid fees in the same manner as other liens on property are foreclosed, and such water privilege shall, again be subject to appropriation.

Section 1596a—21. If any appropriator shall, for ninety (90) days after payment is due, fail to pay the annual franchise fee, or shall for ninety (90) days fail to comply substantially with any of the provisions of his franchise or of this act, the conservation commission shall forthwith notify the attorney general in writing of such default, and the attorney general shall forthwith commence suit for foreclosure and forfeiture, as provided by this act.

Section 1596a—22. It shall be the duty of every appropriator to keep a correct daily record of the number of horsepower daily put to beneficial use by the said appropriator. It shall be the further duty of every appropriator to report once in each three months, viz., on the first day of April, July, October, and December, to the conservation commission, upon blanks to be furnished by said commission, the exact and correct number of horsepower daily put to beneficial use by the said appropriator, stating the number of hours per day such horsepower was put to beneficial use. It shall be the further duty of every appropriator to furnish any and all information as may from time to time be required of such appropriator by the conservation commission or the legislature. Such information shall be furnished upon blanks to be furnished by said commission and failure upon the part of any appropriator to comply with the provisions of this section shall be deemed a substantial non-compliance with the provisions of this act, and of the franchise granted to such appropriator.

Section 1596a—23. The provisions of this act shall not apply to corporations heretofore organized in whole or in part to establish, maintain or operate a system of water reservoirs for the purpose of regulating the flow of water in any river in the state.

Section 1596a—24. The conservation commission and each member of said commission, for the purposes mentioned in this act, shall have power to administer oaths, issue subpoenas, compel the attendance of witnesses and the production of books, accounts, papers, records, documents and testimony. In case of

disobedience on the part of any person or persons to comply with any order of the commission or any member thereof, or on the refusal of any witness to testify to any matter or matters, on which he may be lawfully interrogated before the conservation commission, proceedings for contempt, as provided in section 1797m—41, of the statutes, shall, upon the complaint of a member of said commission, be instituted to compel obedience. Witness fees and mileage shall be paid as provided in section 1797m—54 of the statutes.

Section 1596a—25. Any party, feeling himself aggrieved by any act done, or by any findings or rulings made by the conservation commission, *subsequent* to the granting and acceptance of the franchise as provided in this act, shall have the right of appeal to the circuit court of the county in which said dam is situated. In case said dam is located in two counties, then such appeal may be taken to the circuit court of either of such counties.

Section 1596a—26. The conservation commission may prescribe the character of measuring instruments and devices to be used, by any appropriator, and a reasonable standard of the accuracy thereof and the methods by which said accuracy is to be determined. Said appropriator shall provide and use such instruments and devices and have the same tested accordingly.

Section 1596a—27. A franchise granted under and pursuant to the provisions of this act shall take effect and be in force after its passage and publication and the filing in the office of the secretary of state by the appropriator of a written acceptance of the terms and conditions provided in this act. Such written acceptance must be filed with the secretary of state within ninety (90) days after the passage and publication of the franchise. Failure to file such acceptance within ninety (90) days shall render said franchise null and void and of no effect.

Section 1596a—28. In case the conservation commission herein referred to, with power to perform the duties herein imposed is not created by law, then such duties so imposed upon such conservation commission shall devolve upon and be executed by the railroad commission.

SECTION 2. This act shall take effect and be in force from and after its passage and publication.

A BILL

To amend section 1596 of the revised statutes of Wisconsin, prohibiting the building of any dam, bridge or other obstruction in or over any navigable stream without the permission of the legislature.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. Section 1596 of the revised statutes of Wisconsin is hereby amended to read as follows: Section 1596. All rivers and streams which have been meandered and returned as navigable by the surveyors employed by the government of the United States *and all rivers and streams navigable in fact for any purpose* are hereby declared navigable ~~so far as the same have been meandered~~ to the extent that no dam, bridge or other obstruction shall be made in or over the same without the permission of the legislature; but this section shall not be construed to impair the powers granted by law to towns, counties or cities to construct bridges over such rivers and streams. The consent of this state is hereby given to the acquisition by the United States of all lands and appurtenances in this state which have been or may be acquired by the United States for the purpose of erecting thereon dams, abutments, locks, lock-keepers' dwellings, chutes or other structures necessary or desirable in improving the navigation of the rivers or other waters within and on the borders of this state, and the United States may hold, use and occupy such lands and other property and exercise exclusive jurisdiction and control over the same subject to the right of this state to have civil and criminal process issued out of any of its courts executed within and upon said lands.

SECTION 2. This act shall take effect and be in force from and after its passage and publication.

AMENDMENT No. 2, S., TO No. 468, S.

Offered by Senators Husting and Krumrey of the Joint Committee on Water Powers, Forestry and Drainage.

A BILL

To create sections 1494—65 to 1494—68, inclusive, of the statutes, relating to the burning of slashings, limbs, tops and refuse of pine.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. There are added to the statutes five new sections to read: Section 1494—65. Any person who shall cut, or cause to be cut, any pine timber, meaning white pine, Norway pine, and jack pine, for commercial purposes, shall pile the pine tops and refuse as the cutting proceeds, and shall, within one year from such cutting and felling, burn all such piles of pine refuse and tops; and in such burning all reasonable care shall be taken not to damage standing timber or adjoining property and all laws relating to the setting of fires shall be observed and no burning shall be done during dangerously dry weather. The term "burning" shall be construed to mean the destruction by fire of so much of such slashings as would become easily combustible material and dangerous in event they were not so destroyed.

Section 1494—66. Any person violating any of the provisions in regard to the burning of pine slashings, refuse, etc., shall be guilty of a misdemeanor and shall, on conviction therefor, be punished by a fine of not less than fifty (50) cents nor more than two (2) dollars per thousand feet, log scale for all pine timber cut, from which the refuse was not so piled and burned.

Section 1494—67. In case any person fails to properly pile and burn the pine tops and refuse, the state board of forestry may, in its discretion, cause the same to be done and the expense thereof shall be a lien upon the timber or other forest product therefrom the land upon which the tops or refuse are situated or cut, and shall also be a lien upon the land itself. Proceedings for the enforcement of such lien shall be instituted by the dis-

trict attorney of the county in which the cutting was done, at the request of the state board of forestry and in the name of the state of Wisconsin as claimant; and costs shall be recovered in the usual manner. The claim for any lien shall be filed by the state fire warden, or under his direction by any of his assistants, inspectors, assistant inspectors, patrol, or fire wardens, in the district in which the expense occurred, in the office of the clerk of the district court, in the county in which the claim arose.

Section 1494—68. The state fire warden is herewith given full authority to suspend, until such time and under such conditions as he may determine, the provisions of section 1494—65 of the statutes in so far as they relate to the burning of pine tops and refuse, when in his judgment the operator causing such refuse has been prevented by weather conditions, or other causes beyond his control, from burning such refuse without endangering other property.

SECTION 2. All acts and parts of acts inconsistent with this act are repealed.

SECTION 3. This act shall take effect and be in force from and after its passage and publication.

FIGURE 1—EXHIBIT A.

| Period. | Total granted. | *Improve navigation facilitate log driving. Imp. nav. and fac. log driving. | Hydraulic | Improve navigation and hydraulic. | Facilitate log driving and hydraulic. | †Other. |
|---------------|----------------|---|-----------|-----------------------------------|---------------------------------------|---------|
| 1836-40..... | 5 | ..... | 5 | ..... | ..... | ..... |
| 1840-50..... | 58 | 3 | 49 | 4 | ..... | 2 |
| 1850-60..... | 105 | 14 | 66 | 3 | 1 | 21 |
| 1860-70..... | 50 | 23 | 15 | ..... | 6 | 6 |
| 1870-80..... | 101 | 63 | 20 | ..... | 11 | 7 |
| 1880-90..... | 181 | 107 | 22 | ..... | 40 | 12 |
| 1890-00..... | 77 | 25 | 20 | 5 | 17 | 10 |
| 1900-09†..... | 88 | 9 | 30 | 40 | 4 | 5 |
| Totals... | 665 | 244 | 227 | 52 | 79 | 63 |

* Combined as being for the purpose to improve navigation.

† No privileges were granted in the year 1909.

* Includes grants to erect dams to feed canals, for pisciculture, to create ponds, to flow cranberry marshes, for the "public good," for general municipal purposes, and include 44 grants in which no purpose is specified—the context being indefinite, no purpose is given.

Figure 1—Shows, in ten year periods, the total number of privileges granted to erect dams and the purpose or purposes for which such dams were to be erected.

FIGURE 2—EXHIBIT B.

| Period. | Improve navigation facilitate log driving. Improve navigation and log driving. | | | | Hydraulic. | | | | Improve navigation and hydraulic. | | | | Facilitate log driving and hydraulic. | | | | †Other. | | | |
|--------------|---|-----|----|----|------------|-----|---|----|--------------------------------------|----|---|----|--|----|---|---|---------|----|---|----|
| | *A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| | | | | | | | | | | | | | | | | | | | | |
| 1836-40..... | | | | | 2 | 5 | | 3 | | | | | | | | | | | | |
| 1840-50..... | 1 | 3 | | 1 | 38 | 35 | | 12 | 3 | 3 | | 4 | | | | | 1 | 2 | | 1 |
| 1850-60..... | 6 | 1 | 1 | | 28 | 17 | | 8 | 2 | | | 2 | | | | | 6 | 2 | | 1 |
| 1860-70..... | 12 | | 4 | | 7 | | | | 2 | | | 2 | | 1 | | | 2 | | 1 | 1 |
| 1870-80..... | 12 | 1 | 21 | | 13 | | | | | | | | 4 | | | | 3 | | | |
| 1880-90..... | 30 | 6 | | | 14 | 18 | | | | | | | 18 | 22 | 2 | | 3 | 6 | | 2 |
| 1890-00..... | 16 | 20 | | | 12 | 16 | 1 | 1 | 3 | 4 | | | 10 | 15 | | 1 | 4 | 5 | | 1 |
| 1900-09..... | 8 | 11 | | 10 | 22 | 26 | | 23 | 37 | 40 | | 40 | 1 | 3 | 1 | 3 | 5 | 5 | | 5 |
| T tals..... | 85 | 100 | 23 | 11 | 136 | 117 | 1 | 47 | 47 | 47 | | 48 | 34 | 40 | 3 | 4 | 24 | 20 | 1 | 11 |

*A—Eminent domain. B—Reserve clause. C—Limitations. D—Fishways.

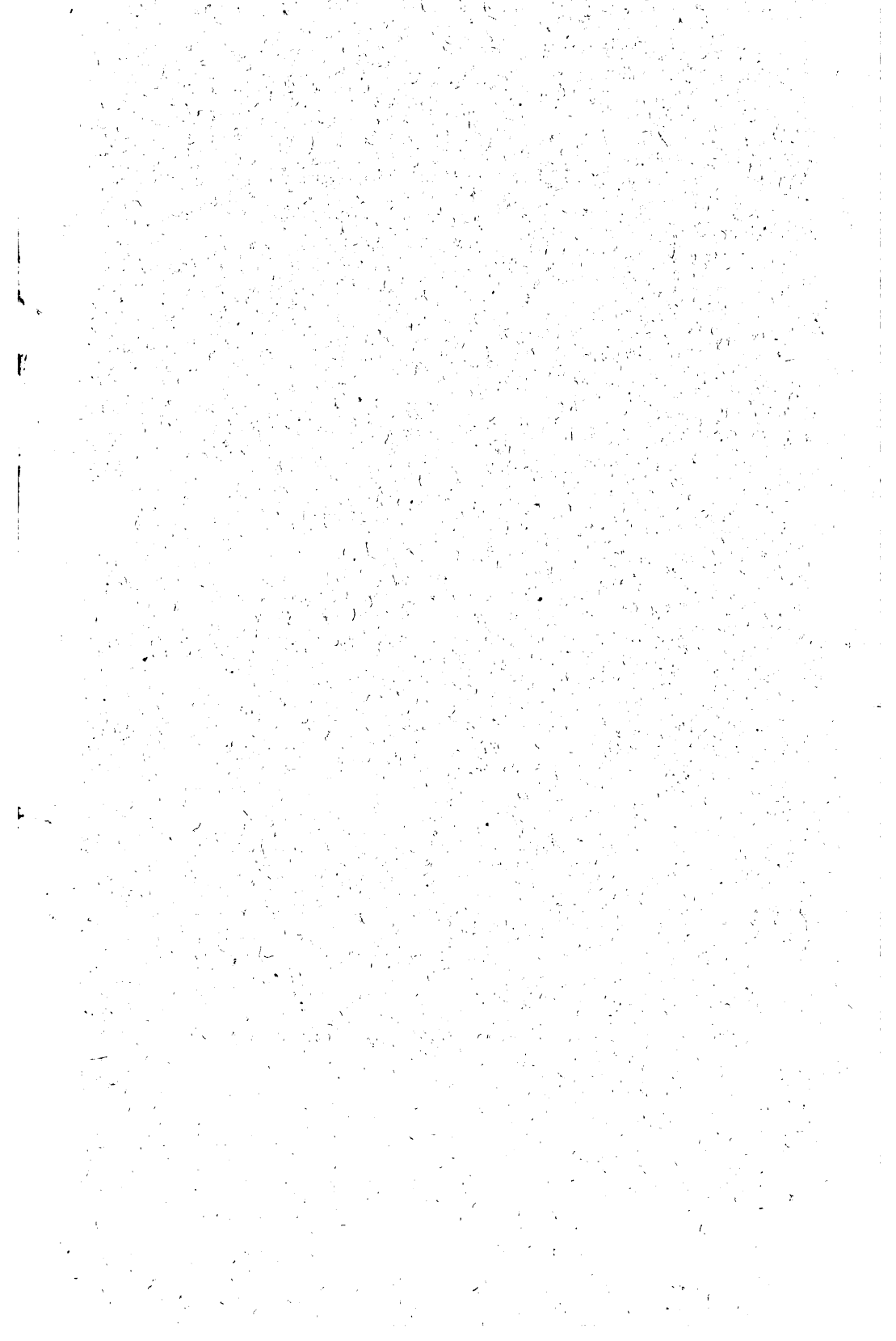
† See note to Figure 1.

Figure 2.—Under the respective purpose or purposes for which the privilege to construct dams was granted, shows the number of grants in the year periods, in which the right of eminent domain is attendant; the reserve clause is found; a time limit is inserted, and in which fishways are provided for.

FIGURE 3—EXHIBIT C.

| Period. | Totals granted. | Eminent domain. | Reserve clause. | Limitation. | Fishways. |
|---------------|--------------------|--------------------|--------------------|-------------|-----------|
| '36-40..... | 5 | 2 | 5 | | 3 |
| '40-50..... | 58 | 43 | 43 | | 18 |
| '50-60..... | 105 | 42 | 20 | 1 | 11 |
| '60-70..... | 50 | 24 | | 5 | 3 |
| '70-80..... | 101 | 32 | 1 | 21 | |
| '80-90..... | 181 | 65 | 110 | 2 | 2 |
| '90-1900..... | 77 | 45 | 60 | 1 | 3 |
| 1900-'09..... | 88 | 73 | 85 | 1 | '81 |
| Total..... | 665 | 326 | 324 | 31 | 121 |

Figure 3—Shows in 10 years periods, the total number of privileges and the number of grants in which the right of eminent domain granted was granted, the reserve clause was inserted, a time limit is found and in which fishways are provided for.



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